The Crippled Turtle

Dedicated to the Preservation of the Environment

A Publication of The Chart

Missouri Southern State College May, 1976

The Legend of the Crippled Turtle

A legend of the Wyandot Indian tribe says that, in the beginning of time, the world was inhabited by only two persons, the First Man and the First Woman. They became parents of a daughter who grew to be a beautiful maiden. The three lived happily, but after a time the daughter became ill. To save her life, the parents determined to cut down the tree of life. But the daughter, realizing that destroying the tree of life would also mean death for her parents, hurled herself into "the great void."

She fell into the Lower World which was totally covered by water. The creatures which inhabited the deep came to her rescue, but realizing their efforts were futile, summoned a great turtle. She then lived upon the back of this turtle, and in time, this turtle became the Earth. It is upon this Earth we now live.

We the editors of The Crippled Turtle believe that as the Earth has been ravaged by the pollution of the air, land, and water, so the legendary turtle of the Wyandot tribe has become slowly crippled. But he is not crippled irrevocably. The fate of the great turtle and the Earth remains in the hand of mankind.

Once it was an earth which was a great treasurehouse of resources offering each man an ample opportunity to confront nature on his own terms—to rule it or ultimately be ruled by it. The drive to challenge the environment remains deeply engrained in the human spirit, and the purpose of The Crippled Turtle is to examine the relationships between man and Earth in the past, present, and future. We are attempting to illustrate man's contributions as well as his disruptions and destruction of nature's balance.

The Crippled Turtle utilizes articles describing new approaches facilitated in environmental protection areas, summaries of current happenings in the field, evaluations of the state of the land, accounts of recreational activities, and interviews illustrating some philosophies of the local populace. Our ultimate goal, however is to report on these areas objectively and forthrightly so as to stimulate the thought of all readers regardless of their environmental philosophies. It is the intention of this publication not to chastise any one faction for past abuses or to promote the ideologies of any one group but to awaken the entire social community to ecological concern.

It is imperative that all men and women be aware of the pollution which threatens the very existence of life on earth. The land has been greatly abused, but the pleasures derived from confronting nature are many. The purpose of The Crippled Turtle is to promote the wise use of our environment and to stand in opposition to its further abuse.

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COVER PHOTO: A fantastic view of the sphere of the Earth as photographed from the Apollo 17 spacecraft during the final lunar landing mission in NASA's Apollo program. The photograph extends from the Mediterranean Sea area to the Antarctica south polar ice cap. Almost the entire coastline of Africa is clearly delineated. The Arabian Peninsula can be seen at the northeastern edge of Africa. The large island off the southeastern coast of Africa is the Malagasy Republic. The Asian mainland is on the Horizon toward the northeast. (Photo courtesy of NASA, the National Aeronautics and Space Administration.)

The Staff

The Crippled Turtle is a bi-centennial publication of The Chart, newspaper of Missouri Southern State College, Joplin, Mo. 64801. It was specifically a project of Journalism 312, Publication Principles. Staff members include:

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The contents and policies of The Crippled Turtle do not necessarily represent those of the faculty, administration, or student body of Missouri Southern State College.

Paper

Americans go through a lot of paper in a year. Think of all those newspapers you've discarded, all the shopping bags you've pitched, all that rubbish from drive-ins you have cleaned out of your car. Every year more paper is used by the people of the United States, and so a correspondingly large amount of pulp must be used. Trees are the major supply for pulp, but fortunately, there is an additional source for pulp: used paper.

Not only can paper be recycled into more paper products but used paper can be used in the making of shingles, insulation, padding for furniture, toys, linoleum, felt, egg cartons and all kinds of cardboard products.

These uses of recycled paper were reported by Bill Stwalley, who has been in the paper recycling business since 1954 and who owns and operates Midwest Fibre Sales located on North Main in Joplin as well as other paper recycling facilities in the area.

According to Stwalley, Midwest Fibre will accept any kind of paper products for recycling. This paper is then separated into six grades before forwarding to the proper places for use in manufacturing.

The Joplin firm has about 40 trucks in the area which collect paper from businesses, retail establishments, schools, private concerns, and factories. Boy Scouts and the Lions' Club occasionally have paper drives which provide more paper and Stwalley emphasizes that paper from individuals is welcome. The average price paid for the paper is ½ c per pound.

Midwest Fibre processes about 100 tons of paper every week at the Joplin plant. Stwalley said the renewal in environmental concern has had little effect on their business in this area. He stated that an ecology class from Kansas State at Pittsburg had a paper recyling drive going for a while, but that has since died out. Otherwise most individuals remain unconcerned.

Not only is the recycing business good for the environment, but also it is sound business. Midwest Fibre has two plants in Springfield which process between 700 and 800 tons of paper per week. From this area the processed paper goes to Wisconsin, Kansas City and other points for re-use, saving great numbers of trees, which are at least as expensive (if not more) to process and keep in supply. A large amount of recycled paper is used by Tamko in Joplin for the production of shingles and insulation.

Recycling our paper products is the only way to insure a perennially adequate supply of this resource of which Americans use so much. Individuals are urged to get involved. Paper and all kinds of paper products may be taken to Midwest Fibre Sales Corporation located just off North Main directly across Main from the VFW Hall betwewn the hours of 7:30 and 5:30 Monday through Friday.

Get involved. If no one does, and the demand continues to get greater and greater, the next toilet paper shortage could be more than a rumor!

Sedalia Lodge

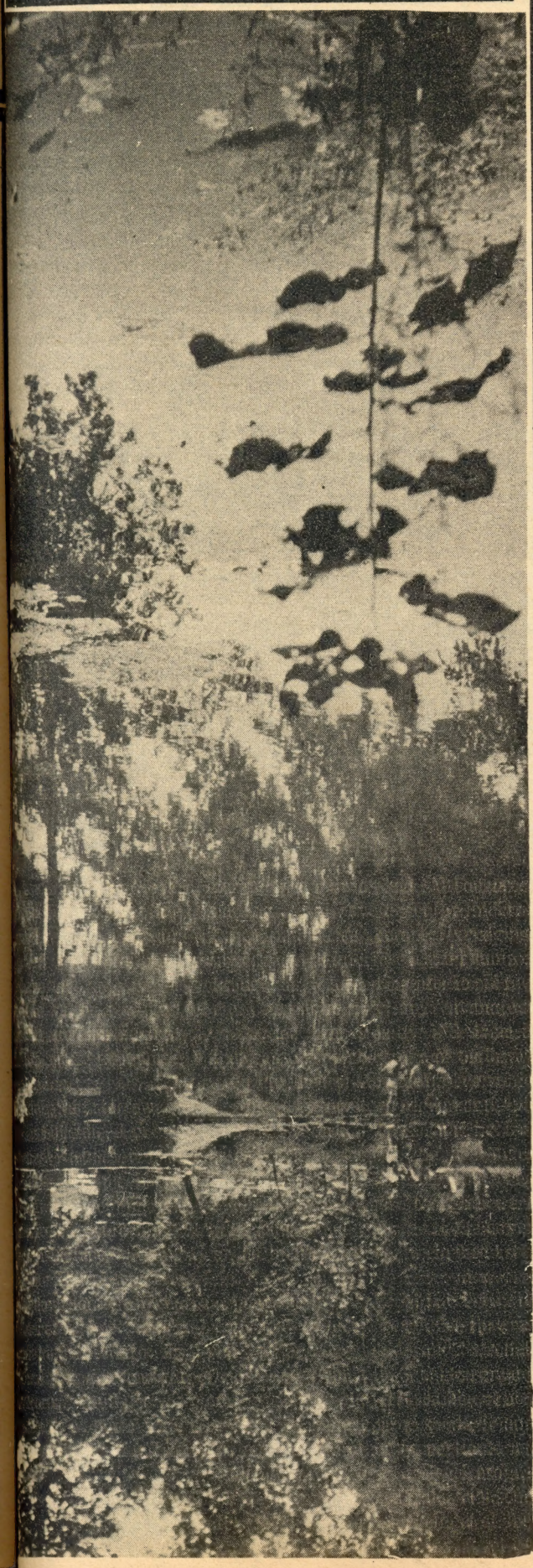
How the state will use the recently acquired Bothwell Lodge in Sedalia has not yet been decided, according to the Missouri Department of Natural Resources.

The 30 room mansion was formerly owned by John Homer Bothwell and was transferred to the state park system in July, 1974.

In a recent poll conducted by the Sedalia Democrat 60 per cent of those responding favored renovation of the lodge for public use, including development as a museum. While many were skeptical of the transfer of the lodge to the state, most respondents felt the lodge would represent a valuable recreational asset for the state.

When plans are completed for development of the 175-acre park adjacent to the lodge, construction and renovation will begin. As funding permits, development of the park will proceed through four phases, to include refurbishing the turn-of-the-century lodge and building a lookout tower on the highest point of a cliff located within the park.

John Newman, former park superintendent at Trail of Tears State Park, will take over duties at the new park as superintendent. Newman, 27, holds an associate degree in business administration from Fullerton College in Fullerton, Calif.



Missouri Energy

Missouri offers an enchanting wealth of opporunities for hikers, horseback riders, bicyclists, motorcyclists, canoeists and other off-the-beaten-track enthusiasts, says Fred A. Lafser, Jr., a resource planner with the Department of Natural Resources in Jefferson City. Lafser, who holds a master's degree in environmental science, says that the most comfortable season to explore trails is from October through June.

Today, Lafser has a challenging career of steering development of the trails system through virgin pathways. The governor has delegated over-all responsibility for developing the rails system to the department, which last year received a $350,000 grant for further construction of the state park system.

In a recent survey it was found that Missouri had some 1,0001 miles of rails for hikers, 21½ miles for bicyclists, 530 miles for horseback riders and 76 miles for motorcycles and other off-the-road vehicles. Still by 1990 the department hopes to provide 1,882 miles of trails for hiking, 3,070 miles for bicycles, 1,346 miles for backpacking and 3,463 miles of equestrian trails suitable for hiking, too.

One of the most interesting trails built thus far was one built for the blind. It is designated as a National Recreation Trail and is the first one accommodating the blind. It runs for one and a half miles through granite outcrops, dense woods and other attractions in Elephant Rocks State Park. The trail is paved with all markers also being in Braille.

To those hikers endowed with idle time and relentless energy the Bicentennial Trail Project will provide an opportunity for them and any other volunteers to build a 20-mile trail near Lake of the Ozarks.

The Citizen Trail Project represents a pilot effort to learn if the public, when guided by the department's technical assistance can lay out the path to skirt the most scenic spots.

Some interesting trails now existing include White's Creek Trail in the Irish Wilderness area of Mark Twain National Forest, Big Piney Trail outside of Rolla, Taum Sauk Trail, of which much crosses private land for which permission should be secured, and the Silver Mines Trail near Fredericktown, which offers scenery rivaling that in Colorado.

Persons interested in joining a hiking club may write: Missouri Trails Association, P.O. Box 643, Jefferson City, Mo.

Recycling

As just about everybody has heard by now (if you're one of those who hasn't, listen), the earth does not have an inexhaustible supply of resources. Fortunately, part of our dwindling raw materials can be and are being recycled. "That's great" you may say, "I'm sure glad they're doing that." Some may even add, "I'd like to help".

Well, Southwest Missouri, talk about it no longer. It's time to do something about recycling your aluminum.

Bart Ramsour and Son, a distributor for Olympia beer, has begun a recycling operation at their 1720 W. 7th Street location. Olympia recycles everthing they sell, so - Olympia bottles also will be collected there for re-use.

The re-cyclying center will pay 15 cents per pound for all-aluminum cans and 1 cent for each bottle. The cans may be for any product, as long as they are all-aluminum, but the bottles must be Olympia.

Ramsour previously operated a can recycling center under the sponsorship of another brewer, but that company discontinued their recycling program. Locally the response to it was good. "Expecially during the summer, when all the kids were out of school, we'd get thousands and thousands of cans, because they'd all go out and pick them up along the highways," a spokesperson for Ramsour and Sons said.

Cans must be all-aluminum to be accepted. They can be checked by examining the bottom of the can. All-aluminum cans are slightly concave on the bottom.

The recycling center at 1720 West 7th Street is open on Monday, Wednesday, and Friday from 1:00 till 4:30 p.m.

Missouri Trails

An energy conservation polciy for state buildings could result in substantial dollar savings for state government, according to Jim Wilson director of the Missouri Department of Natural Resources.

Wilson explained that an energy conservation program would result in a saving of energy and reduction of the rate of growth in fuel bills.

He was speaking in favor of the DNR-sponsored House Bill 1405 which would enable the Office of Administration to start gathering technical data on energy consumption in state buildings and adopt standards and procedures for the design of new state buildings.

WILSON SAID CAREFUL AUDITING and metering of energy loads would be required, costing money and manpower, but that the resultant savings could be substantial.

The director also urged the General Assembly to establish an interim committee to study energy legislation.

"We believe that the state should begin a thorough evaluation of energy legislation and that we're now much better prepared to do this than in the days of the oil embargo. The agency staff could lend its support to the interim committee," he said.

DNR also has proposed HB 1614, the energy facilities siting bill. Wilson told the legislators that it would streamline the power plant approval process, providing "one stop shopping" certification process for electricity-generating plants. The process also would permit a more comprehensive review and anlysis of impacts on the environment and on natural resources.

HE SAID A STREAMLINED and more comprehensive power plant siting program is needed because the historical annual growth rate for electrical power has been seven per cent, meaning it doubles every 10 years. At that rate the demand in Union Electric Company's service area alone would require construction of 10 new plants with the capacity of the Callaway County nuclear power plant by 1955.

In another area of energy conservation, Wilson disclosed that DNR and the Office of Administration have reached an agreement on a new state policy for purchase of automobile vehicles which would generally limit new purchases to compact cars. The proposal is being reviewed by other departments.

Assessing Missouri's current energy situation, Wilson said that while Missourians have been able to absorb the impact of natural gas curtailments this year, the long-term oil and gas situation "remains bleak."

"The only significant and certain alternative to our heavy reliance on oil and gas in Missouri seems to be conservation of these sources of energy, and greater use of coal for electrical generation and conversion to synthetic gas in place of natural gas," Wilson said.

HE SAID THAT THE GREATER use of coal doesn't necessarily imply that it will be used exclusively in electrical power generation.

"If this were to be the case, then electrical power, which now meets less than 10 per cent of the nation's energy needs, would have to grow at staggering rates.

"The problems associated with very high electrical growth rates resulting from the substitution of electical power for natural gas could be lessened through greater state and national emphasis on the direct combustion of coal by industry for heating and industrial process, and on coal gasification," Wilson said.

The Energy Policy and Conservation Act signed into law by the President on Dec. 22, 1975, will have a major impact on the state's energy program carried out by the Missouri Energy Agency.

THE NEW LAW CALLS for state energy conservation plans which would reduce consumption by at least five per cent by 1980.

Marvin J. Nodiff, director of DNR's division of planning and policy development, said states will now become eligible for federal funds to help develop energy conservation programs for reduced lighting in public buildings, for encouraging carpooling and for energy efficiency and insulation requirements for new and remodeled buildings.

Nodiff said federal grants to the 50 states are authorized at a level of 50 million per year for each of the three fiscal years beginning with fiscal 1977. This could mean up to one million dollars to Missouri for each of those years if Congress appropriates the money.

Remembering the Land

First there was the land. It was a land of mountains, caves, meadows, forests, and bubbling springs. And for the Indians who had migrated westward from the Atlantic coast, it was a natural home. Among the tribes which came was one known as the Wah-Sha-She, meaning "water people." Early French explorers changed their tribal name to Osage.

Of all the Indians living within Missouri during these earliest times, none excited the interest or admiration of the white man more than the Osage. When the first French explorers visited the region late in the 1690s, this tribe was living near the mouth of the Osage River. Before 1718 one group moved up the Osage to establish its villages near the headwaters of the stream. These became known as the Great or Big Osage, or Pa-heitsi,the "campers on the mountains." The rest of the tribe, together with their cousins, the Missouri, moved westward up the Missouri River to the present area of Saline County. Because of their village site in the Missouri River bottom, they were called the Little Osage or U-tsehta, the "campers in the low land."

Various archaeological evidences show that the Osages migrated into the southwestern portion of Missouri, probably because disease infested their own sections of the land. Certainly the Indians who inhabited the Ozarks area of southern Missouri in the 1600s were similar to the Osages.

THE OSAGE MEN WERE of impressive height, averaging six feet or more. They were described as "well formed, athletic and robust men of noble aspect." The feats performed by their runners were remarkable and, indeed, it was not uncommon for the Osage to walk 60 miles in a day. Their war parties traveled great distances. They aided in the relief of the French at Detroit in 1712; and Che-to-ka, or Whetstone, a Little Osage, claimed that he was at Braddock's defeat with all the warriors that could be spared from the villages.

The ordinary dress of the Osage men included a breechcloth of blue or red cloth, secured by a girdle, and a pair of leggings made of dressed deerskin, concealing all the leg except a small portion of the upper thigh. Unornamented mocassins made of dressed deer, elk, or bison skin, and a blanket to cover the upper portion of the body, completed the costume. The women wore mocassins, leggings of blue or red cloth, a piece of blue cloth draped around the waist, and another piece of cloth draped over one shoulder.

The villages of the Great Osage were laid out irregularly, and contained small cone-shaped huts and larger oblong structures. The latter, described by Zebulon Pike, perhaps the first white man to explore southwest Missouri in 1806, were about 20 feet wide, and varied in length from 40 to 100 feet, in width from 15 to 20 feet. They were made of a framework of poles covered with a matting of woven rushes. Smoke from the fires made in the center of the lodge was allowed to drift through apertures left in the roof for that purpose.

THE OSAGE SUBSISTED chiefly through hunting, but they annually raised small crops of corn, beans, and pumpkins. The men hunted from May until August, returning in time to gather the crops left unhoed and unfenced during the summer. Late in September, the fall hunts began; these continued until about Christmas. The Indians then remained in their villages until February or March when the spring hunts commenced; first the bear, then the beaver hunt. Both were plentiful in southwest Missouri.

Those who were fortunate in the hunt provided for the destitute, and it was customary to send provisions to the lodges of the poor, the widows, and the fatherless. This spirit of consideration was reflected in the government of the Osage. Although authority was nominally vested in a small number of chiefs, usually hereditary, no important decision was ever made without consulting the warriors in council. There was no regular code of laws, but rather a tacit understanding of the right to command.

Conspicuous among the various Indian tribes for their general sobriety, the Osage remained for more than a century but little changed by their association with white traders and visitors. "You are surrounded by slaves," old Chief Has-ha-ke-da-tungar, or Big Soldier, once remarked to a white friend. "Everything about you is in chains, and you are in chains yourselves. I fear if I should change my pursuit for yours, I, too, should become a slave."

IN THE 1540s WHEN HERNANDO DE SOTO explored this section of America, it is thought likely he reached that portion of southern Missouri known as the Ozarks. The Indians he encountered in Missouri were referred to by his chroniclers as Capahas and Casquines. The historian Louis Houck is convinced that De Soto's men roamed over parts of the Ozark Mountains. In any event, the Osage had little contact with the white man for nearly 150 years after DeSoto. By that time white settlers told stories to their children of earlier explorers, and these stories became more detailed and more interesting with the passage of time. They became, also, more colorful. One is left to wonder what led to these stories in the south central portion of Missouri if the Spaniards had not, indeed, transversed the area.

Less questioned is Zebulon Pike's 1806 trip across this country of southern Missouri. Pike camped on the Osage River near the present site of Bagnell Dam and followed the Little Osage through Vernon County. Evelyn Milligan Jones in her little book "Tales About Joplin...Short and Tall" says that one reason for Pike's journey was "to escort to their homes in this Jasper County area a number of Osage and Pawnee Indians who had been imprisoned among the Potawatomi."

Mrs. Jones also tells us that the first white man to live in this region (Jasper County) was Edmund Jennings, a woodsman who explored the Ozarks in the early 1800s. He liked what he found here so much that he stayed, a lone white man, living among the Indians.

She gives us this anecdote: "When Jennings returned to his native Tennessee after fifteen years, his friends had given him up for dead. They barely recognized him at first, for he was dressed in skins and mocassins, and he could hardly make himself understood, since after so many years English was strange to his tongue.

"People gathered from miles around to hear Jennings' stories of the marvelous new country. In describing the wonders of the land to the west, he seemed to say 'the country of the Six Bulls.' Because he had not spoken English for many years, his pronunciation had become corrupt; what sounded like 'bulls' was intended to be the word 'boils,' meaning the clear, beautiful streams that came boiling up: Spring River, Center Creek, North Fork, Shoal Creek, Indian Creek, the Cowskin. At least six boiling rivers flowed through this region, and innumerable springs gushed from rocky caverns."

"THE COUNTRY OF THE SIX BOILS" became "the of the Six Bulls," a name which lasted for this portion of County for many years.

l Matthews, a regent for Missouri Southern State takes up the narrative at this point in his book "The Land." With word of this new Eden having reached ee, he says, the wagon trains were assembled in lle, Bristol, and Cumberland, Tennessee, and dozens of aces in the Appalachian Mountains, wherever people urge to settle in the Ozarks." With them came Ken- and others who were beginning to feel that their section untry was becoming too crowded. Word of the new land east as well, to Ohio among other states. Many of the to southern Missouri were veterans of the war of 1812 ed in the famous Battle of New Orleans under Andrew in 1815.

very western edges of the new land, in what was to Jasper County, the Osage tribe had been partially d by the Delawares. Even as late as 1820 the Delaware ered the county. Their ruler was Chief Sarcoxie who large teepee sheltered by enormous oaks by the side of Even before the white settlers came to this area, Chief worked for peace. But the President of the United as ordering the Delawares to move further west, and e was hastened in 1831 when Thackeray Vivion from arrived at the spring where Chief Sarcoxie lived. He first permanent white settler in what was to become County. Within a short time, twenty-four families land from the public domain and received patents the President of the United States.

ones tells us about Vivion: "Soon the white men who nto this region began to gather here, too, for Thackeray ad built a mill. It was only a corn grinder, with a of near zero—slow as the mills of the gods—but was a country where there were none....Sarcoxie the town n then as Centerville, perhaps because it was almost nter of Barry County, of which Jasper was a part in ys. Some people remarked that Centerville took its m being halfway between Springfield and the end of the This flourishing settlement, now the metropolis of the changed its name to get a post office. Because another Missouri was named Centerville, the settlers chose to community Sarcoxie, after the Indian chief who had so mped there with his tribe."

HEWS GIVES THIS ACCOUNT: "Chief Sarcoxie was understand when he heard about the President of the States signing patents which gave the white man ip of the land—land which he thought had belonged to ans since the beginnings of time. Sadly he asked his tribe their meager belongings. And facing the setting sun, lged westward thru the tall buffalo grass. The sadness in the heart of Chief Sarcoxie could be magnified and ed many times in the thousands of his red-skin cousins e forced to move ever westward beyond the frontiers of te man. Chief Sarcoxie accepted the edict of removal nity and humility, and the tears which did not show left clear to seek a new home. He departed from the land had called his own.....For $1200 in cash and $1500 in ntise the area which is now known as Jasper County had rchased by the government from the Osage Indians who the original settlers. The Delawares, who were here in s upon the arrival of the first permanent white settlers, erely transits, having already been caught in the moving he United States."

rea was now the white man's domain, and with 1500 en sent by the Governor of Missouri to escort the final out of the territory, the "Sarcoxie War" of 1837, as it bed, marked the beginning of the settlement of Jasper in large numbers. The county was officially created on y 29, 1841. The name chosen was in honor of a tionary War hero, Sgt. William Jasper. In the battle of oultrie, South Carolina, in 1776, after a day of can- g, the staff from which floated the pine tree flag of the e was severed. The flag fell outside the fort. Jasper ver the ramparts, retrieving the flag in a hail of bullets. ned the flag to a sponge staff used for cleaning cannon discharge and hoisted it again to its place.

the new county it became necessary to establish a county ntiment favored Sarcoxie, but a number felt a new ity should be built to signal the beginning of a new era in untry of the Six Bulls." The year was 1842, and in the hical center of the county, where a dense forest grew, ne side of which flowed the water from one of the Six a county commission established the new city. One r of the commission with the toe of his boot marked the f the square for the new city. Since the land selected d to the public domain of the United States, it had to be ed. Enough land for the city square and for sufficient es to build a town was purchased at a cost of $1.25 per he first courthouse cost $398.50 to build. It was a one story building with one large room. One end of the building had a door opening toward the public square; the other end had a fireplace. The name Carthage was selected for the new city, chosen from the city of ancient North Africa. In November, 1842, Dr. Gabe Johnson built a residence in the new town. Some say it was the first. Others, however, say Henry Piercy built the first home. George Hornback opened the first store. Some 22 years later Confederate guerrillas burned the courthouse, the business section, and most of the residences. After the Civil War, a lead and zinc mining boom elsewhere in the county brought the town a share of prosperity. In the 1880s marble quarries were opened and the economic base of the town was firmly established.

DURING THE LATTER PART of the 19th century Carthage was known throughout the nation as the home of two widely publicized women, Belle Starr and Annie Baxter. Belle Starr (1846-89) was born Belle Shirley, the daughter of Judge John Shirley, a Carthage citizen of wealth and standing, and a Southern sympathizer. When Edward, Belle's brother, joined Quantrill's band, his sister gave him regular information as to the movement of Federal troops. She was an excellent rider and pistol shot, and after Edward was killed she herself became a member of Quantrill's bushwhackers. In 1866 Judge Shirley moved to Texas, where Belle eloped with Jim Reed, one of the old Quantrill gang. Reed was shot by a friend who hoped to gain the reward offered for his capture, but Belle frustrated this plan by refusing to identify the body as her husband's. Later she married Sam Starr, a Cherokee, and with him established a ranch on the Canadian River in Indian Territory. The ranch became a notorious bandit hideout, and the headquarters for Belle's band of "eight men who rode under her orders." Here she was shot by Edgar Watson, wanted in Florida for murder.

Mrs. Annie Baxter enjoyed fame of an entirely different nature. She was clerk of Jasper County, and the first woman elected to public office in the United States. Elected in 1890 she was prevented from taking up her duties on the grounds that women did not have the right to hold office. Mrs. Baxter carried the case to the State Supreme Court where she won a favorable decision. Her resolution in fighting for her rights brought such widespread attention that she was made a colonel on the governor's staff.

The lead and zinc mines which were to bring prosperity to Carthage had begun elsewhere in the area. Lead was discovered in Granby in 1853, setting off the "Granby stampede." The lead ore, found from 10 to 75 feet below the surface, was raised in buckets by windlass and crank, or by the "whip" which utilized ox power. More than 3,000 prospectors, miners, gamblers, land speculators, and smelter operators poured into the town, and a period of hectic activity followed.

CHRISTMAS WAS CELEBRATED with fireworks and pranks. Few had Christmas trees in their homes, for gifts were distributed beneath the church tree. One miner who struck it rich just before Christmas is said to have used two wagons to haul the presents for his family. During the 1880s the town's first exuberance was somewhat curbed, but life was still far from dull. One man who made a profession of hunting down criminals for whom rewards were advertised used to dump the bodies of his victims in the main street of Granby "to be identified." Stealing, however, was almosst unknown. The miner who demanded "hard money" rather than treasury notes took his pay home in a water bucket unmolested. It was not unusual for a group of miners who worked as partners to sit down on main street and carefully divide the bucket's contents, repairing to the corner saloon "to get a drink and change" when the dollars did not come out even.

Miner's language, generally unprintable, was varied by such novel expressions as "posey-check," an I.O.U. named for the local pool hall keeper, and an "Alex Watson load" of ore, one so small as to be only a "shirt-tail load." A local resident was nicknamed "Navy" because, looking through glazed eyes at a print of the "Battle of Manila," he imagined himself in conflict, drew his pistols, and "sank every ship in the Spanish fleet." Fritz Looney, an itinerant bow and arrow maker, answered all questions in rhyme. All mine tragedies were credited to "Blind Tom", a folklore character who worked on the "graveyard shift" from midnight to morning, and weakened timbers, and started cave-ins.

After the Civil War, mineral deposits along Joplin Creek diverted mining interests from Granby. The value of zinc was discovered in the 1870s, but it was not until the World War brought a demand for it that Granby experienced fresh prosperity. When the war ended, profits ceased, and the mines and smelters closed.

A LITTLE FURTHER SOUTH another city was platted, this in 1839. The name chosen was Neosho, the name coming from the Osage Indian word for clear water because of a large spring near the center of town. Neosho was made the seat of Newton County. By July, 1850, at least three lead mines had been opened in the vicinity. The most productive was that of Mosely, Oldham, and Company, five miles northwest of Neosho on Shoal

Creek. Like others in the vicinity, this firm found difficulty in shipping its products to market. Overland hauling costs to Boonville, the nearest Missouri River port, were prohibitive, and shipping on the Grand River was made dangerous by unfriendly Indians. However, the industry developed rapidly and Neosho grew with the mining boom.

On October 21, 1861, the secession members of Missouri's General Assembly met here and adopted an act "declaring the ties heretofore existing between the United States and the State of Missouri dissolved." The approach of Federal troops caused the House and Senate to adjourn, to meet 10 days later at Cassville. In 1863 Neosho was garrisoned by Federal troops, and a part of the time by Indian soldiers. General Joseph Shelby attacked the town October 4, 1863, and shelled the courthouse, which was garrisoned as a fort. Captain McAfee, in command of the Federal troops, surrendered. In 1866 Neosho was rebuilt and reincorporated.

And in 1868 the town of Seneca was platted. The town was a group of frame and stone cottages scattered about a massive stone grinding mill. Since 1869 Seneca has been famous as the center of the country's only tripoli deposits of great importance. Tripoli, used originally for scouring ahd polishing purposes, has proved to be an excellent filter stone for city water systems, and a good filler for hard and substitute rubber compositions.

GOLD PROVIDED THE BOOM for a more southern settlement at Splitlog, a crossroads settlement some four miles to the northwest of Anderson. In 1887 a group of men posing as mining promoters, interested Matthias Splitlog in financing a McDonald County gold and silver mining venture. Splitlog was a Wyandot Indian who had made a fortune in Kansas City real estate, although unable to read and write. With his financial backing, events moved fast. The Splitlog Silver Mining Company was organized, the city of Splitlog laid out, and a daily stageline to Neosho begun. Assay reports claiming a heavy deposit of gold and silver threw the countryside into a fever of mining excitement. The roads were lined with white-topped wagons labeled "bound for Splitlog." A railroad company was capitalized at $3,000,000 and Splitlog was made treasurer of the construction company. He drove the first spike—a silver one—with appropriate flourish "after music by the Indian band from the Territory." But the railroad venture, like the mining boom, collapsed when the promoters overplayed their hands. People became suspicious and the bubble burst. The promoters fled in time to escape punishment, but Splitlog was ruined. The railroad later became a portion of the Kansas City Southern line.

Meanwhile news of Missouri was still filtering into the eastern areas of the nation. Henry Ward Beecher in a New York address said: "In this vast ocean of land and at nearly its center stands the imperial state of Missouri. All admit that in natural resources it leads the rest and is the crown and glory of the United States".

One Tennessean who heard the news of Missouri was John C. Cox who, a year after his marriage to Sarah Mercer, began the westward trek with their infant child and their Negro slaves. They stopped briefly at Sarcoxie Springs on the eastern border of Jasper County but then proceeded closer to the Kansas border. There they established a camp near a stream of clear water. At night, far across the stream, came the sounds of wild turkey. To the stream Cox gave the name Turkey Creek. In the winter of 1828 the Cox family erected a permanent camp site. Eleven years later, a Rev. Harris Joplin, a Methodist circuit minister, rode into the forest near the cabin of John Cox. He decided to remain and staked a claim for 80 acres straddling Joplin creek. Joplin and Cox became friends and when Cox laid out a town, he gave it to the name Joplin in honor of the man who had "directed his fortunes toward serving the Lord."

THE CITY WAS BUILT literally upon the mines that were to nurture it. It was near the center of a lead and zinc belt that swings in a 30 mile crescent across the corners of three states. It was the greatest zinc producing area in the world. Yet it was the land which had brought the settlers here originally. By 1841 a settlement had grown up around the cabins of Cox and Joplin. Cox opened a small store, and, commissioned a postmaster, set up in his store a postoffice, calling it the Blythe Postoffice in honor of Billy Blythe, a wealthy and popular Cherokee. Blythe lived on Shoal Creek. Church services were held in Joplin's cabin until he returned in 1844 to Greene County where he died three years later. The discovery of lead in the immediate vicinity of the city was accidental, despite the fact that the almost pure deposits were so close to the surface that they were sometimes exposed by flooding creeks or hard rains. About 1849 David Campbell, a miner from Neosho, visited his friend, William Tingle on Turkey Creek at the mouth of Lead ville Hollow. Noticing what he thought to be an abandoned Indian or Spanish excavation, Campbell investigated. When the first digging produced more than a hundred pounds of galena, Campbell and Tingle developed the mine. Pig lead from it was hauled overland to Boonville and sold by Tingle's slave, Pete. From there it was taken by steamboat to St. Louis. In 1850 the firm known as Tingle & McKee advertised that they had a good mine and were in the process of building a log furnace.

During the year of the Campbell-Tingle strike, a Negro boy belonging to Judge Cox turned up several large pieces of ore in Joplin Creek, near the Campbell mine, while digging for fishing worms. "Cox's Mines" developed, and soon other strikes were made in the Joplin Creek area. Further hope of immediate development, however, was shattered by the Civil War. No major engagements occurred in the vicinity, but Jasper and near-by counties became a marching and recruiting ground for the contending armies. Foraging parties discouraged mining enterprise by taking whatever they found, including smelted lead to use for bullets.

When the war ended, the richness of deposits in the vicinity attracted national attention. Old and new mining companies began operations, and miners and prospectors poured into the region. Land was offered for lease on a royalty basis of 10 per cent of the ore recovered. Necessary equipment consisted of a pick and shovel, a windlass and ore bucket, a hand drill, and some blasting powder. Here was the poor man's chance for fortune, and a fever of small mining operations broke out.

For the most part those who migrated to the Joplin and other Tri-State mining camps had little in common with the Bet Hardy characters who crowded the West in the gold rush days. Although the mining camps drew their share of adventurers, most of the settlers were of English and Scotch-Irish descent—"hill folks" from the near-by Ozarks—who came with their wives and children. Even in the "wide-open" days, family life was the dominant factor in Joplin and the other mining camps in the area. Newly arrived European immigrants have played a role in the Tri-State mining camps.

IN 1870 THE GRANBY COMPANY, then the largest in the area, offered a prize of $500 to the miner or company of miners who produced the largest amount of ore within a given period. E.R. Moffet and John B. Sergeant, employees of the company, won the prize. Quitting their jobs, they leased a piece of land from Cox along Joplin Creek and spent most of the prize money for powder and tools. They then sank the first shaft in the valley and having struck a rich pocket of lead ore, built smelting furnaces on the present site of the Union Depot. A few years later, when Captain E.O. Bartlett invented a process for making sublimed white lead, Moffet and Sergeant purchased the patent. With this monopoly and the expanding prosperity of the mining field, they developed the Lone Elm Mining and Smelting Company into one of the largest in the district.

Within a year after Moffet's and Sergeant's strike, 500 men were mining lead in the Joplin Creek Valley, and intense rivalry sprang up among the various companies. On July 12, 1873 Patrick Murphy of Carthage organized the Murphysburg Town Company, which purchased a tract of 40 acres west of Joplin Creek and platted the town of Murphsyburg. A few weeks later Cox retaliated by platting a townsite east of Joplin Creek between Galena and Cox Avenues and Central and Wall Streets, which he named Joplin City. Rivalry between the two towns was immediate and bitter. Saturday night fights became the accepted means of establishing superiority. Between mass brawls—led by such characters as "Reckless Bill," "Three Fingered Pete," "Rocky Mountain Bob," and "Dutch Pete"—the children fought back and forth with stones. The winter of 1871-72 was known as "the reign of terror," and "Dutch Pete" was its monarch. But in the early spring, J.W. Lupton, a miner, licked the armed bully, and other law abiding citizens were stirred to action. Lupton was made constable. On March 1, 1872, the county court was petitioned to incorporate the two towns under one Charter and name it Union City. This charter had hardly been granted before its legality was questioned, and on March 23, 1873, when the combined population was approximtely 4,000 the state's general assembly passed an act incorporating the two towns as the City of Joplin.

Because it was generally regarded as a boom town that would soon exploit its wealth and die, the city at first held small attraction for the railroads. In 1875, however, Moffet and Sergeant organized the Joplin Railroad Company which, in 1877,

pleted a 39-mile branch line connecting with the Gulf Railroad at Girard, Kansas. Two years later this line was purchased by the St. Louis and San Francisco Railroad. In 1882 the Missouri Pacific Railroad extended its tracks to Joplin; four other railroads followed in the next two decades.

The railroads not only provided a cheaper means of freighting lead, but made possible the development of the zinc industry. Joplin's growth was immediately stimulated. The potential value of zinc had been pointed out before the Civil War, but its extraction was difficult, the market price was low in comparison with lead, and freighting charges were high. Miners consequently discarded "black jack" as worthless. Eventually, however a satisfactory means of processing the ore was discovered and by 1872 Joplin began to ship out zinc. The price rose rapidly from $3, to $15 a ton. In 1880 Jasper County Zinc production was double that of lead.

BY 1888 THE CITY, with an approximate population of 8,000, was a nationally recognized lead and zinc center. But the town was young, and sudden wealth is a heady wine. Great fortunes were made and lost in "handkerchief-size" plots. Men plunged, either in cards or with mining leases. Miners were paid off in the saloons (the town had 40) on Saturday nights and spent Sundays nursing heads cracked during drunken brawls. The price of metal fluctuated, and it was sometimes possible for a miner to make more by digging ore himself and selling it to a buyer than working for companies. Lead and zinc were widely accepted as money. Small boys gleaned the waste discarded by careless and inefficient mining methods, and turned in the metal for candy. A miner who lacked cash for tickets at the Blackwell Opera House could exchange a wheelbarrow load of ore for family admission. Even groceries could be purchased with lead or zinc.

Eventually, of course, the town sobered up. The businessmen who had control of the city government further developed the reform measues instituted by Lupton in the 70s, and changes began to take place in the town's commercial life. Wholesale concerns were established. The smelters moved from the more or less exhausted local mines to the rich deposits which had been discovered south and east of the city, and Joplin settled down to the buying and selling of ore, the processing of metals, and other regional industries. By 1900 Joplin had become the largest town and railroad center of the district, and diversified activities had been introduced. Left behind, however, were the scars of the mines, scarring the land which had originally brought settlers to the area, leaving behind tailing piles and gaping mine holes. The land was no longer as it had been.

The city continued to develop, more slowly now, in the 20th century. These facts about Joplin in 1940 may prove interesting to the reader:

Railroad Stations: Union Depot, NE corner Main St. and Broadway for Kansas City Southern, Atchison, Topeka, and Santa Fe, and Missouri-Kansas-Texas Railroads; SE corner Sixth and Main Sts. for St. Louis-San Francisco Railroad (Frisco Lines); S. side Tenth St., Main St., to Virginia Ave., for Missouri Pacific Railroad.

Bus Stations: Union Bus Terminal, NE corner Third and Joplin Sts. for Southwestern Greyhound Lines, Crown Coach Co., and Victory Transit Lines; Joplin Bus Depot, 317 S. Joplin St., for Missouri, Kansas, and Oklahoma Trailways; All-American Bus Station, 315 Main St., for All-American Bus Lines, Inc.

Airports: Municipal Airport, 4.7 miles NE of postoffice on N. Main St. Rd.; no scheduled service; taxi fare 50 cents.

Interurban Stations: Joplin Public Service Co., 201 E. Fourth St., for half-hourly bus service to Webb City, Carterville, and Carthage.

Taxis: 10 cents per passenger.

Local busses: Fare 5 cents.

Motion Picture Houses: Six (Fox, Paramount, Orpheum, Electric, Rex, and DeRay).

Radio Stations: WMBH

Concert Halls: Memorial Hall, SW corner Eighth and Joplin Sts.

Athletics: Miner's Park, NE corner Eighth and Joplin Sts, for Western Association baseball; Junge Field Stadium, Jackson to Murphy, Thirteenth and Fifteenth Sts., for football.

Golf: Schifferdecker Park, 18 holes, green fees 35 cents.

Much has changed since even then. But the city, founded on the banks of Turkey Creek, and then on Joplin Creek, in the heart of the area known as the "country of the Six Bulls," owed its beginning to the beauty of the land and the pureness of the waters. Now, 200 years later, the land is somewhat an eyesore; the waters are stagnant and the rivers are dying. What's left is worth preserving....but we remember the land....as it was.

America

Great nations have always spawned men, who, when standing in the masses, loom a little taller, and have taken the reigns of leadership into their hands and led the people to greatness. America has produced such individuals, but the real saga of America is built on the strength and character of little people—people who came to this country with nothing more than a dream and climbed into the mines, stoked the furnaces of the mills, broke and tilled the land, gave of themselves, their sons and daughters, and their money. In the beginning, they were a rag-tag lot, and they suffered the pains of growing with the nation, they toiled, but more importantly, they stayed and built a nation.

The immigrants who came to America had many reasons for coming. Some came to escape political and religious persecution, while others, sick of the years of endless wars and turmoil in Europe, wanted to find honorable work, and decent homes for their children.

What brought them is not really important though. It's what they brought with them— A spirit of adventure—that seemed to permeate all of the immigrants. It was almost as if they knew something big was going to occur.

ONCE THE GATE to the West was open for settlement, these immigrants, with all their dreams, struck out, often ill-prepared, and almost always penniless. In their haste to begin a new life, many mistakes were made. The proud warriors of the Plains knew and understood his environment, but these new and over-zealous intruders had much to learn. Arable land by the millions of acres were plowed up and turned into dust storms. They were unprepared for the long and cold winters and the unbearable heat of the summers that burned their crops up before they could be harvested.

They lived in sod-houses with dirt floors, and the women, often no more than girls, turned old and gray overnight. Young children worked the fields along side the adults from sunrise to sunset. It was a rough and cruel land for the unprepared and it took a heavy toll. Sometimes, it broke the hearts of the people.

Yet, they persisted, and they learned, and in the years that followed, those small farms were passed from father to son, and each succeeding generation learned more about the and. They learned when to plant, what to plant, about crop rotation how to save the soil, and utilize new equipment. In time, the farms of the mid-west would become the breadbasket of the world.

IN THE LARGE EASTERN CITIES, which could best be characterized as a population growing faster than economic progress, poor and ignorant immigrants found themselves in debt to the "company store," working at back-breaking jobs that were often dangerous, and families had to send their children to do the same chores the men were performing in order to survive. The conditions many found themselves in were no better than the ones they had fled froM.

Men like Boss Tweed, who was the protype for later big city political swindlers, ran the ghettos like field generals. The poor and ignorant masses were preyed upon by both politician and corporation alike, and being ignorant in the ways of democracy, they often voted for the henchmen that kept them down.

Yet, they too persisted, and somehow, things got better. The social consciousness of Americans was beginning to awaken. Labor organizations began to organize and learned men began to take a look at the dominant capitalistic system embraced by business men as not being the answer to individual rights. While the idea of rugged individualism may have its merits, America was fast to learn that business could not operate without some type of control from our government.

WHILE AMERICA WAS SUFFERING from growing pains, another, and more serious problem, which had been brewing for some time, was about to surface.

The issue over slavery in the South was a growing concern to the young republic. Abolitionists had for years, been carrying on campaigns in the North to resolve the question of slavery. Negroes who had escaped from bondage told of their experiences as slaves. Old Sojourner Truth and Harriet Tubman shocked audiences wherever they told their tales of the slaves sorry lot in the South. Still, many people in the North disbelieved what they heard.

When Lincoln was elected in 1860, South Carolina seceded. Patriots in the South, like Sam Houston of Texas, and James Petigru, down in Charleston, fought hard to keep their states in the Union, but their pleas fell on deaf ears. They knew what would happen, and when that fateful shot was fired on Fort Sumter, brother turned against brother, and a growing young nation was split down the middle.

When the war began, there was a total population of 31,000,000 people in the country. Of that number, 22,000,000 would remain loyal to the Union with only 9,000,000 seceding.

OUT-GUNNED AND OUT-MANNED, the South, from the beginning, was doomed. Although the South displayed a surprising bravado at first, which allowed her to win a string of upset victories it was just a matter of time.

When it finally ended, with the South being totally destroyed, the Black man was finally free. But the seed of hate and mistrust had been sowed, and for many, that hate was destined to be passed from generation to generation, and even today, it remains in the hearts of some.

d the real tragedy is that it took the Black man a hundred safter the end of the war to be able to share equally with the e man.

e years following the Civil War led America into an era of rialism, imperialism, social reform, and the expansion of ledge and reform.

HILE MILLIONS OF IMMIGRANTS were pouring through urnstiles, offering an unlimited labor pool, Americans selves were beginning to migrate to the large cities in h of decent jobs and wages. The large cities were begin- to burst at the seams with a mixture of various races le to find jobs.

e wealth of the Nation began to accumulate into the hands few families. The source of that wealth was the natural rces of the states and national domain, bought at low s, and in many cases, acquired by fraud and manipulation. e were such glaring exploits that movements were laun- for the conservation of the national heritage in forests, s, minerals, water, power and other natural resources.

anwhile, as agriculture and manufacturing were maturing e nation, and our representative government were "trust ng," a new plea began to surface to stop immigration to our es. Some Americans became so irate watching newly ralized citizens flocking to the polls and voting in the party es, that a loud cry went out. Although this was primarily a lem in the large cities in the east, nonetheless, organized r saw unchecked immigration as a threat to the workers dy strapped. The Unions wanted to improve the standards wages of the workers already here.

NALLY, WHEN ENOUGH pressure was applied to ress by these various unions, the gates began to close, and laws were passed to limit immigration.

e continent had been rounded out. No more land was lable in the west and exploitation of the domain by crude had come to an end. It was truly the end of an era.

was inevitable that migration to America, if not stopped, to at least be slowed down. They came when she needed n, and they toiled in the fields, helped promote the rapid lopment of the nation, enriched its culture, and fortified the of liberty.

the Statue of Liberty, there is a passage that has become a bol for all people who ever yearned for freedom:

Give me your tired, your poor,
Your huddled masses yearning to breathe free,
The wretched refuse of your teeming shore.
Send those, the homeless, tempest-tost to me,
I lift my lamp beside the golden door!"

In all the wars that America have fought, with the exception of our natural-born Americans, the descendants of the American Indians, it has been the sons and daughters of the immigrants who have carried the fight to our enemies. During these major crises in American history, men with different heritages have joined hands in a common goal, and in the process, discovered they are not as different as they thought.

IN THE PACIFIC, during World War II, American Indians drove the Japanese army crazy talking their native language on communication nets. Known throughout the Pacific war zone as the "code-talkers," the Japanese were unable to decipher their language, enabling American combat leaders to send out their combat movements in the clear.

Black fighter pilots helped clear the skies of Europe, enabling bombers to reach their targets. Individual black army units slugged their way across both Europe and the Pacific, and built a reputation of men to be reconed with.

One entire regimental combat team was made up of Japanese-Americans, and they become the highest decorated unit during the war, at a time when their mothers and fathers were in guarded camps in the western part of the United States. One of those individuals that served so valiantly, and lost an arm, is today, a United States Senator.

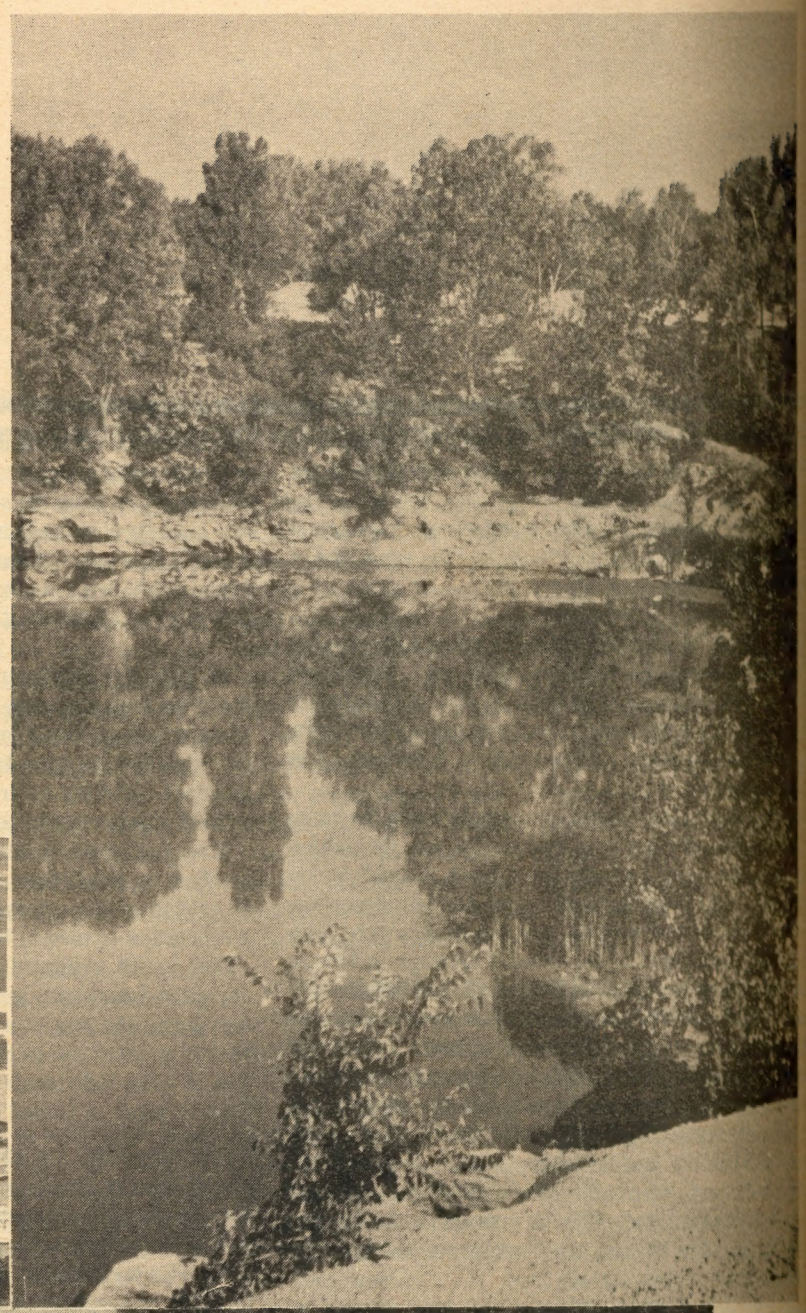
THE STORIES OF THE EXPLOITS of individual ethnic groups in the war could go on and on. The important thing is that they answered their countries call in a time of crisis. Those men were proud of their heritage, but more proud to be an American.

America means many things to many different people. It has its faults, and mistakes have been made. Bitter scars have been engrained into the hearts of some. We have polluted our natural resources in our haste to build, but we are learning. We have hurt our fellow Americans by our insults and slures, but we are learning that love is more powerful than hate. We have tried to cure the world's ills, only to discover that in order to do that, we must cure ourselves first. Things get a little better with each new generation, and that has been the history since the beginning. There is no doubt that things will continue to get better.

America is people, and people make mistakes. People also find the cures, and in the eyes of the world, we stand alone and unique in our ability to find cures for a better society.

The past 200 years have been a learning period for America. It is now time for Americans to apply that knowledge to useful purpose. It is time to evaluate our priorities and set the stage for our future. The pinnacle of Americas surface has not even been scratched yet. It's time to get it on.

Enjoying the Land



Keeping Afloat With a Boat

America's water-oriented recreation activities have surged upwards as more people head for their favorite rivers, lakes, bays, and coastal areas to enjoy boating. This trend will continue as new kinds of boats and boating equipment are developed.

In the Bureau of Outdoor Recreation's economic analysis in 1973, boating was projected to be the third fastest growing outdoor recreation activity. In 1972 approximately 18 million activity days were spent in canoeing, 32 million in sailing, and 126 million in other types of boating.

With the energy crisis now a reality, interest in boating will take new directions, with emphasis on boats that don't use gasoline or diesel fuels. As an example, river running on fresh water streams may climb in popularity, as will the use of rowboats, canoes, and other muscle-powered watercraft and sailboats.

Because of the new directions in boating, let's talk mainly about the non-motorized kind of boat.

THERE ARE SEVERAL FACTORS in deciding on the type of boat or boating experience you want to buy. Perhaps most important is the type of water where you will use it the most. For example, a canvas-covered wood canoe is great for open lakes, but not very satisfactory in white-water rivers. The type of boat will change when used for salt water versus fresh water — large lakes and the ocean will call for a much sturdier boat then needed in calm bays, small lakes, and farm ponds. Be sure to talk to experienced people for the type of water experience you are planning.

There are dozens of types of boats and many categories under each type. Only major varieties of the small family type boat without a motor, for daytime use, will be considered in this article.

Sailboats are the fastest growing type of boats, and probably the most popular of these is the cartop sailboat. This is a small boat, 11 to 12 feet long, normally with a single hull and single sail. Most will have less than 100 square feet of sail.

The smaller and cheaper cartop sailboats are relatively flat on top, which is where you sit or lie. But most of these sailboats will have a recessed area so that you can put your feet inside. The recessed type tends to be more comfortable.

While most sailboats have a single hull, many modern boats have two hulls, called a catamaran, or three hulls, which is a trimaran. Fiberglass is the most popular material, but many of the smaller boats are made of polystryene, some with a hard surface covering.

These cartoppers are "fun boats" but as with any boat, skill in operation is important. It is strongly recommended that you wear a life preserver while sailing.

SAILING OF ANY SORT requires special skills. Any person planning to sail should take instructions, and then practice in lower wind velocities before venturing into higher winds and larger bodies of water.

Catamarans are probably the fastest sailing craft afloat, with double floats spaced some distance apart, and a good sized sail. Sails vary from about 90 square feet on a 12-foot boat to around 200 square feet on an 18-footer. There is little water resistance. Usually with a rudder on each float, catamarans are highly maneuverable.

Trimarans generally are larger boats and even more stable than catamarans. Since they are substantially bigger and more expensive, it is recommended that a family try smaller boats before getting a trimaran.

Probably most persons start out with rowboats. They are safe, maneuverable, durable, hold a small family comfortably, are easily transported on a cartop or in a station wagon, and may even be operated with a small outboard motor. They are often available for rent at most parks and boat rental agencies.

Rowboats are stable for fishing and general family use. Aluminum is the most common material, but some are now being made with fiberglass.

CANOES ARE THE OLDEST TYPE of boats in America, having been used by the Indians. They are light, maneuverable, readily operated by one or more persons, easy to portage around rapids or from one lake to another, an efficient way of moving over the water, and generally more fun that a rowboat.

While generally used for paddling in rivers and lakes, they also are used quite often in white water canoeing over rapids and in fast water, for floating down a river, and even for sailing. Canoes are more sensitive in operation than a rowboat and require more skill and care.

Kayaks are small, one-man canoe type boats, very light, very maneuverable, and fast.

Easily upset and righted again, a kayak usually has a canvas with a drawstring to fasten around the person to keep water out of the boat.

Kayaks generally are made of canvas over a framework. Some are made of rubberized inflatable material, and a few kayaks are aluminum.

There are a great number of rubberized inflatable craft for many uses. A small one-man raft is carried on some airplanes and boats for emergency use.

Rubberized craft are popular for duck hunting.

Sizes range from the one person type to big ones carrying 12 persons for large river floating. Probably the most common size is the four-man type.

RUBBERIZED CRAFT are made with compartments so that if one section is damaged and loses air the other units can keep the carft afloat. They are lightweight and ride on the surface of the water. Thus, wind can carry them over the water and make maneuvering difficult.

Some inflatable boats are in the shape of kayaks, canoes, and even rowboats. Rubberized canvas material is superior to vinyl or plastic in most cases. Some of the larger units have a provision for mounting outboard motors.

Heavy duty units are great for river floats and can even go through rough water. However, great caution msut be observed to keep from hitting sharp rocks and other objects. Extreme care must be exercised during inflation of rubberized boats to guard against excess pressure and avoid opening streams.

Dinghies are very small light boats, normally used in conjunction with a larger boat for emergency use or to get from the dock to the larger boat. They come in aluminum, fiberglass, polystryene, and other materials. Probably the most common material is fiberglass. Some can be equipped with sails, but most have oars or paddles.

A few types of boats are available that can be folded for transport on cartops or in station wagons. They take considerable time for assembling. In purchasing this type of boat, check very carefully to be sure you are saving time and the boat is what you want to meet your needs.

A JOHN BOAT is essentially the same as a rowboat, except it is square at both ends. It is very stable and frequently used for fishing and hunting. It is usually transported on a cartop or in a stationwagon.

Before buying a boat, try to attend a boat show where boats may be seen, analyzed, and compared. And if you can, take a ride in the type boat you decide to buy prior to signing on the dotted line.

Different types of package trips can give you a great chance to see what kind of boating experience you like best. Package trips run from part of a day to several weeks. Generally a professional guide plans for the equipment and supplies needed.

Float trips can be found all over the United States. Guide fees average around $25 per guide per day. The total package with food and other supplies varies greatly by the type of trip and comfort desired. An average might be $35 per 24 hours per person.

The best way to find our about these trips is to write the public authority for the area you want to visit. An example would be Grand Canyon National Park Headquarters. Some of the more popular trips require reservations six months in advance. So plan early and know what is furnished and what you must furnish.

There are whitewater schools in Colorado, California, and Canada that supply all the equipment and teaching for $130 a week and up. Ths schools generally last two weeks. Look for the special schools in sailing and navigating, often provided by the Coast Guard Auxiliary.

MANY TYPES OF MATERIALS are used in boats. Information from a reliable dealer for the type boat you are considering is highly desirable.

Generally speaking, aluminum for the smaller boat is light in weight, will bend rather than break or tear, is normally riveted but may be welded and is easily maintained. Aluminum varies in thickness and in quality, primarily in heat treatment which increases strength and resistance to bending.

Fiberglass is a very popular material for boats. It is heavier than aluminum, is tough, can generally be very smooth on the surface, is eaily maintained and corrosion-resistant, comes in many colors and color combinations, and is easily repaired. If color fades on fiberglass, it can be treated with a rubbing compound and waxed.

A.B.S., A new type material used primarily in canoes and light craft, is a high impact type plastic. In canoes it sometimes is used as one skin on the inside and outside, giving a glasslike appearance, with three lyers of inner foam for floatation.

Corlite is a polystyrene with a plastic type covering. It is light and yet resists damage. Polystyrene is a foam type material which is very light, but easily damaged unless protected with a tougher coating. Some small sailboats are made of polystyrene.

PVC IS A POLYVINYL chloride material used with rubberized type rafts and boats. It is more durable and more flexible than rubber and will not rot as fast.

Hypalon is a very heavy, durable nylon type material. It is practically puncture-proof and is thus used for river rafts and inflatable boats. It is more expensive but worth the extra cost.

Canvas over wood is used as a covering for many small boats and canoes. It is lightweight and rather durable, but unless protected can be easily punctured and damaged.

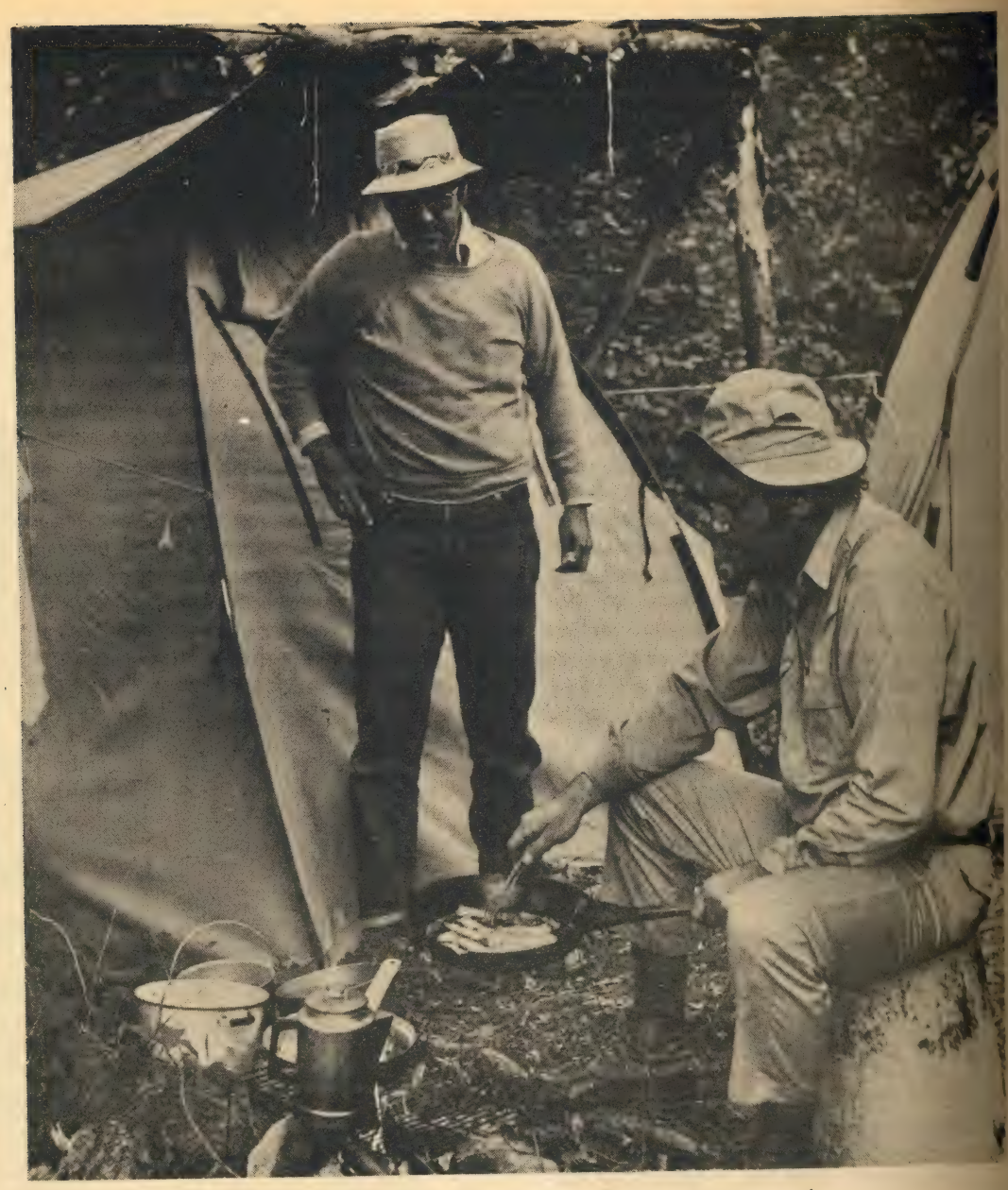
In purchasing any boat be sure to check the various types of materials available in that particular boat, and select the one most suitable for your needs and the conditions under which you will be boating.

As a beginner, rent or arrange some tryout for any kind of boat you think you would like. Remember that skill is needed for real enjoyment.

Start with simple equipment, and trade for more advanced equipment as your skill and enthusiasm increases. A lot of people have bought expensive equipment, had a bad experience, and then found themselves taking a much lower price in order to sell.

Often money can be saved by purchasing good used equipment. Many camps and resorts use equipment for one year and then sell it. You can try out the exact boat you might want to buy.

Dealers often have good used bargains, too.



Camping Booms

It used to be a way to get away from it all. There was even a time they called it "roughing it." It was done with only the bare essentials and only the Boy Scouts were considered "normal" if they did it more than once a year. It was called camping.

Now things are different in the world. It may be that the hippie culture brought our consciousness back to nature, so man began to pack up their families and things and go out to the places of recreation and parks. Soon the more the people began to make the exodus out of their concrete cities they schemed ways of taking more of the luxuries with them. They invented campers on trucks instead of tents. They crowded more luxuries and more "necessities" into these vehicles than ever before. Man then discovered America. During the great drive for us to discover America First, (remember "see the U.S.A. in your Chevrolet?") we soon learned that you could save money camping. So campgrounds sprang up with the natural beauty of New York's lower East side. The owners were the "slum lords" who got rich off the whole deal and made the roughing as easy as possible. And then came that which was inevitable—the house van. The complete touring home on wheels—now we are really roughing it!

Whatever happened to that idea of getting away from it all? Where did that pioneer spirit go that we had that told us to get out of our concrete jungles and back to nature? Has it, as much of our unspoiled nature, been lost forever to those who capitalize on everything they can manage to? When one goes out to get away from the confusion of the city must he be forced into an area that has more people per square foot than the average ghetto?

OF COURSE, there are many people in these campgrounds who enjoy the company of others around them and would not trade the fellowship for any amount of solitude. It is for these people that this article is NOT written. It IS to those who have memories of going with a few companions and discovering God and nature in some isolated situation where you can get to know yourself and those with you as you seldom can in a city situation. It is to those who long to really get away from it all that I write. And to those whom the youth culture got to just enough to make them creep out into the world to see what nature is in their big bulky Winnebagos: give up. Don't try to read this article. It is not for you unless you think you can change.

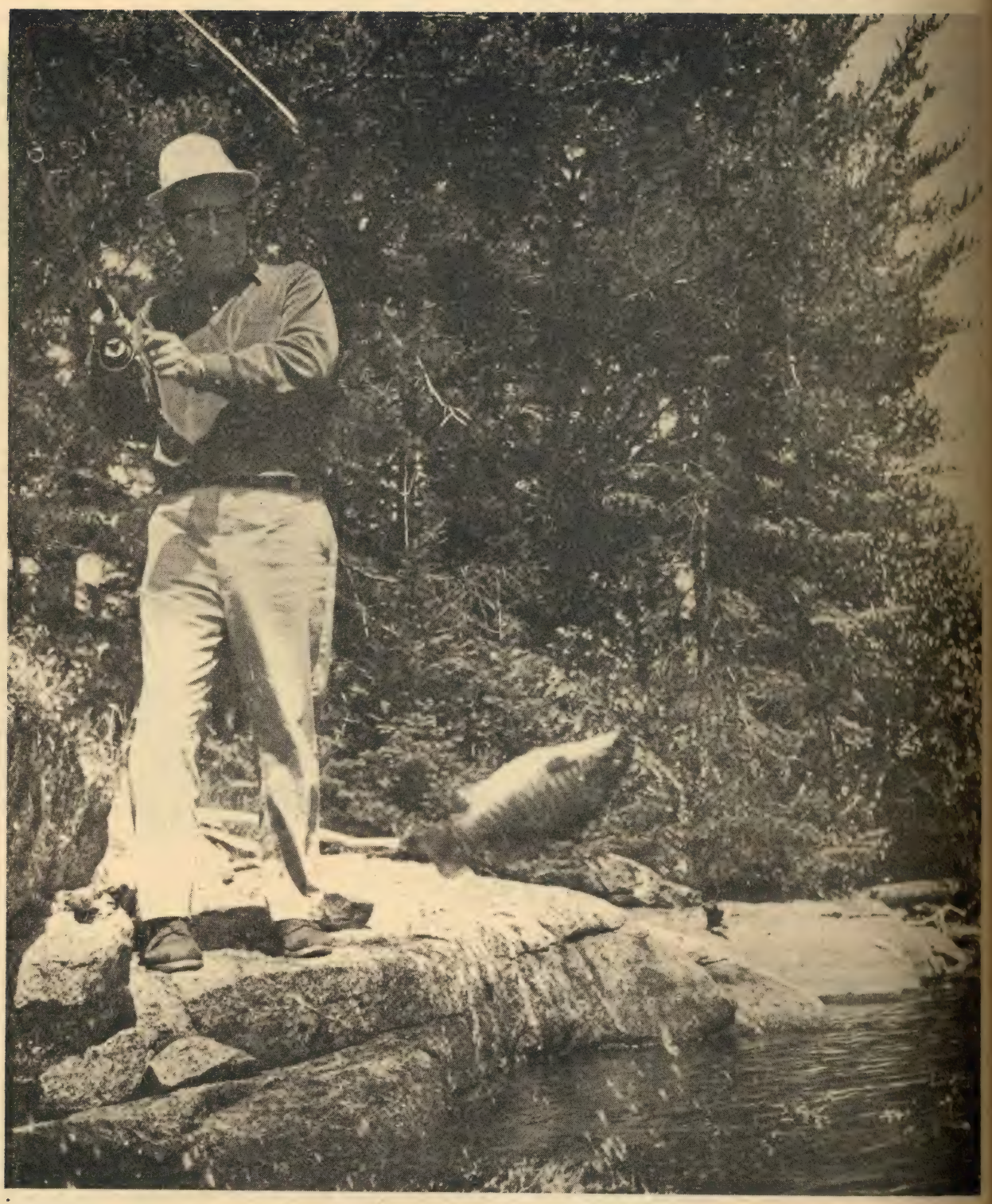
There is one way that I know of that is left that the average person in the United States can use to get away. Backpacking. Take not only the essentials but only the essentials you can carry 30 miles a day, and then go out into the wilderness and discover your inner abilities to survive as the forefathers of our nation did. But before you pick out your pack and go, let me give you a bit of advice as one who knows that the most important advice I could give is the Boy Scout motto: "Be Prepared." Let me suggest some ways of preparation.

There are many ways for a person to prepare for such a trip. - How is your health? Do not overestimate it, for though you may be as healthy as the next suburbanite, you may fall short of the demands nature puts on you.

HOW MUCH KNOWLEDGE of the outdoors do you have? Are you a green tenderfoot or have you been involved with surviving on your own? It may be good in assessing these traits and skills that you take a trial run, a short overnight or weekend trip to find out where you stand. Once again, do not over-rate yourself as Mother Nature has a way of thoroughly testing you. Even if you feel you know all there is to know it would be wise to pick up some good reading on the subject from someone you know you can trust. One such man is Colin Fletcher, the first man to walk the entire length of California, 1,000 miles. And this was on his first trip. He was the first man on record to walk the entire Grand Canyon, and his book "The New Complete Walker", is a fine one. He also has four other books out, all but one of them on backpacking. "The Complete Outdoorsman's Handbook" by Jerome J. Knapp would also be useful.

Whatever you do decide to do, though, if you go the route of backpacking you will need knowledge of the outdoors and your equipment, After that all you need is a nice wilderness which you can go to for as long as you wish, and survive. There are special trails, such as the Appalachian Trail, 2025 miles in length, or any woods you would prefer..

With a minimum of time and a maximum of preparation you can discover for yourself one of the last ways to "get away." But I must warn you that the greater majority of people might invent some way to go these trails and take their color T.V. and then even the backwoods will go to sleep not by the sound of late night owls but by the sounds of the Johnny Carson show!



Fishing

If fishing were a man, he would be a man for all seasons. No other sport offers such breadth of year-round satisfaction or such a gamut of challenges to both mind and hand.

It provides compensations to the most vigorous who seek the stimulation and rewards of fishing the remote mountain lakes and creeks, reached only after arduous back-packing excursions, or of deep-sea expeditions after giant marlin and tuna. But it also serves the more contemplative who seek the quiet repose of still fishing from an anchored skiff, or who gain fulfillment from the artful practice of fly tying.

As a start let's consider the various species of fish you might wish to catch. We shall divide fish into three broad categories: panfish, gamefish, and sea fish.

Generally most of us start fishing for panfish. This group includes the sunfish family, yellow perch, and catfish. All these fish take readily and willingly to a wide variety of lures or baits, and they are delicious when served in or directly from the pan.

Panfish can be enticed by fishermen with the simplest of equipment and the most elementary technique. A cane pole, a length of line, a float, a hook, and a worm will suffice for any of the panfish. Once caught they can be prepared for the pan by scaling and gutting or alternatively they may be skinned and filleted.

ONCE THE PANFISH ANGLER achieves his initial goal of demonstrating his or her ability to catch panfish repetitively, he may strive to enhance the quality of his fishing experience. In so doing the first step is to upgrade his equipment so that the available range of lures, line weights, distances, etc., is substantially increased. Usually a spinning reel and rod are selected as the next phase in advancement.

The spinning reel consists of a stationary spool carrying a length of monofilament line, a bail or pickup device to direct the line onto the reel and a crank which rotates the pickup device restoring the line to the spool.

In operation, the lure, attached to the monofilament line and dangling several inches beyond the rod tip, is cast by swinging the rod from a position slightly behind the shoulder through a forward arc to a position in front at approximately eye level. Proper timing of finger pressure on the line as it leaves the reel combined with the rod acceleration controls the distance the lure will travel.

Spinning gear will provide the family with a very versatile fishing tool. Lures as light as a sixteenth of an ounce with two-pound test monofilament line will provide enjoyable sport with any of the panfish. Heavier lures and lines will more than adequately subdue far larger fish.

LURES ARE AVAILABLE in a near infinite range of weights, sizes, shapes, and colors and include such items as spoons, spinners, jigs, plugs, and bugs, and well as natural baits.

With adequate spinning gear, anyone is prepared to pursue the fascinating and challenging game fish. This category includes the world famous and aristocratic salmon, the trout, the chars, the grayling, the basses, and the pike family.

Salmon fishing is quite specialized, essentially restricted to the more northerly coastal states, and tends to be the province of the relatively affluent angler. However, thc Kokanee and Coho salmon offer reasonable angling opportunities in many cold water lakes.

Pursuit of the trout in free-running streams or cold water lakes satisfies the needs of many persons for physical as well as intellectual involvement. Although many trout annually are taken with spinning gear employing artificial lures as well as natural baits of a wide variety, the prime quality experience accrues to those who meet the gamefish with a fly fishing rig.

Perhaps the most sought after gamefish are the trout and chars. These fish—such as the brown, rainbow, and brook trout—not only provide an abundance of pleasurable and uncountable hours to fishermen but also support an enormous tackle and hatchery industry as well. Trout can be found in commercial ponds, in cold water lakes, and in free-running clear and cold streams.

AT COMMERCIAL PONDS, equipment is usually readily available or one may choose to try out personal fishing gear with an assured probability of success. However, most fishermen find the easily repetitive success of the commercial ponds totally lacking in intellectual stimulation and seek the trout on more even sporting terms.

In fly fishing the angler casts a minute lightweight lure, the fly, to either a sport where he has detected a fish rising to the surface or where he thinks there might be one lurking.

Because of the lightness of the fly it is not possible to cast it directly, employing its mass to drag line off a reel as in the case in spin or bait casting. Instead, a length of the heavier fly line is stripped off the reel. Using the fly rod, you flip the line into the air overhead, and behind and then follow through with a forward power stroke accelerating the line so that it travels toward the

selected stream spot. The weightier fly line in its foward momentum carries the leader and the fly with it.

In this manner by casting the fly line instead of the lure, it is possible to deliver an ultra-lightweight fly to a specific fish with delicacy and accuracy.

Longer flyrods, 8½ to 9 feet, provide matched sport for the larger gamefish such as the salmon and salt water species as well as possessing the necessary strength and stiffness to deliver larger bug lures for the bass family. More probably, however, the bass fisherman will want to select either spin fishing, spin-casting, or bait casting equipment.

SPIN-CASTING GEAR is quite similar to spin fishing in that a closed-face, fixed spool reel is employed. Because the line spool is enclosed, direct finger pressure cannot be used and instead a thumb key is provided to control the flow of the line. Due to the greater confinement of the line, higher friCtion loads are developed. Thus, spin-casting reels won't function with lures as lightweight as those usable in spinning.

Bait-casting rigs employ a free running spool and are used to deliver lures and baits similar in size to the baitcasting gear. Both of these units are often applied to trolling for pickerel, pike, and muskellunge as well as for large-and smallmouth bass and a wide variety of other pan-and gamefish.

Of necessity, highly-specialized fishing activities demand the appropriate furnishings.

For example, backpacking fishing expeditions favor the use of lightweight reels and combination spin and fly rods which dismount into four or more short sections.

When ice covers many of the lakes and ponds, different fishing techniques come into play. Holes chopped through the ice cover let the fisherman present his lure, which is usually a live minnow, to the fish below.

THE REMAINING CATEGORY of fish, namely seafish, share many of the characteristics of the other classes and hence quite similar equipment is used. There are however, two major environmental differences which deserve specific consideration:

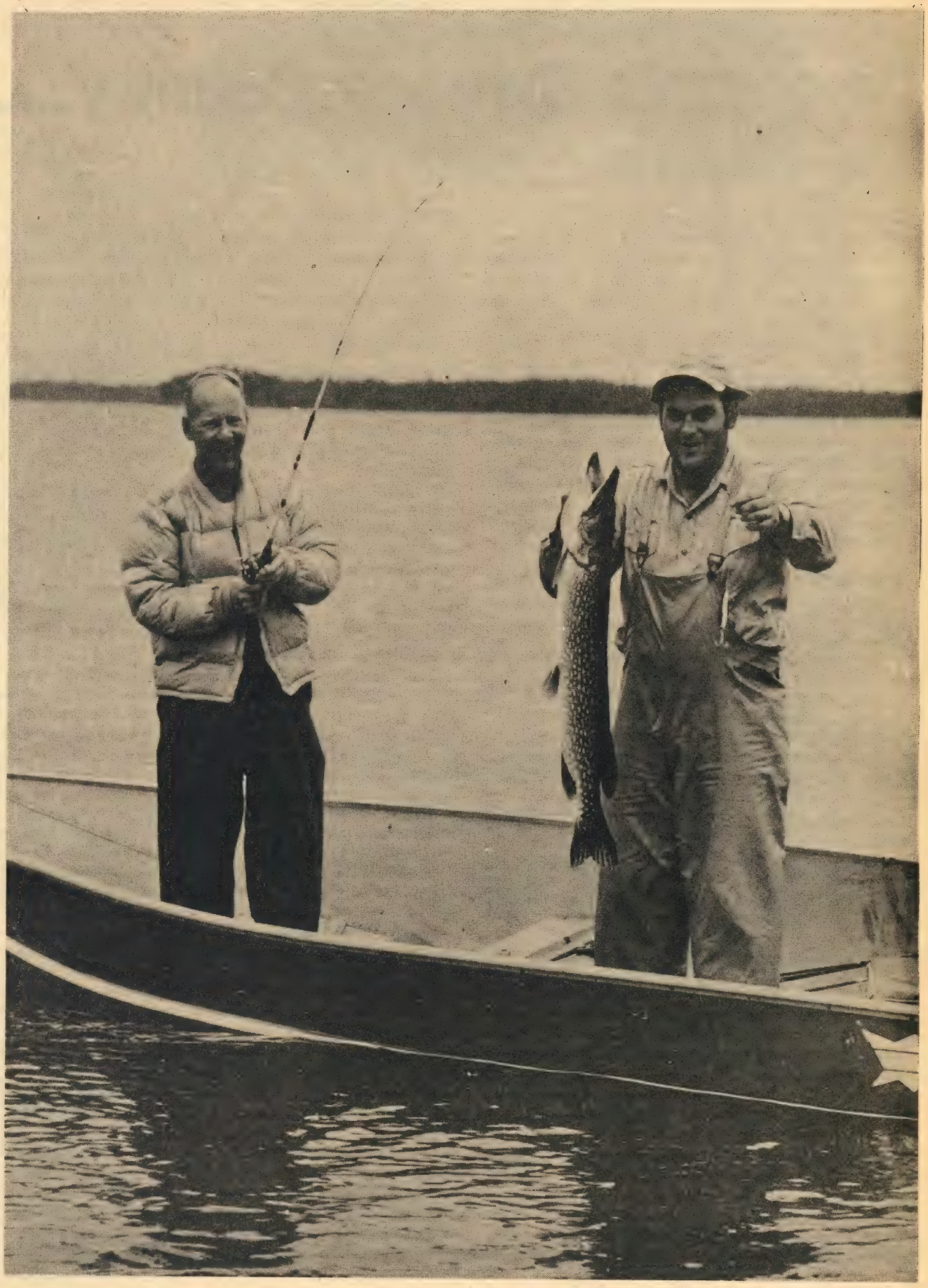
1. The corrosive nature of salt water puts a premium on equipment able to withstand its effects.
2. The generally larger size of the fish and the surging nature of the surf tend to favor substantially heavier gear whether it be flyrods, spin, spin-casting, or bait-casting in nature.

Frequently, worrisome choices are faced in selecting the first set of fishing gear for the family. For the very youngest a bamboo pole with line, bobber, hook, and worms will suffice. For those with better coordination, spinning gear is the suggested choice to cover a very broad range of fishing needs.

In selecting equipment for women, lighter weight tackle will prove to be doubly satisfying from the criteria of handling ease and fishing pleasure.

If the very best is desired, split bamboo rods or the newest boron or high modulus graphite fiber rods deserve attention.

For the ultimate in an enjoyable, peak quality experience, try fly fishing with barbless hooks which allow injury-free release of the fish in accord with the highest principles of conservatism.



Bikomania Sweeps Country

Bikomania, a highly contagious fever, is sweeping the country from coast to coast. The only known cure is to ride a bike. Nearly 100 million happy victims, including Mom, Pop, and the kids now are taking the delightful treatment and pedaling their two-wheelers into an exciting new world of fun and adventure.

America's love affair with the bike has spawned some startling statistics. In 1973 this new life-style in transportation stimulated the sale of more than 15 million of the pedal-propelled vehicles, over half of which were bought by adults. Sales in 1974 outpaced those of 1973, and the pace was swifter in 1975. If the rate continues, bike sales will soon outstrip sales records of automobiles in the peak years of the automotive industry.

Why buy a bike? Partly because riding a bike benefits both you and your environment. A bike doesn't foul up the air, makes no noise, keeps you in top physical shape, takes up less room on the road, and is easy to park in a small place. With appropriate accessories—such as saddle bags, luggage racks, or baskets—a bike can be used on shopping missions, picnic excursions, or bicycle tours.

WHAT KIND OF BIKE should you get? Bewildered by the tantalizing display of racing models with 10-speed gearshifts and lots of fancy gimmickry, you're apt to plunge for something you really don't need. Best advice: buy the simplest model that meets your transportation requirements. You need not invest in dropped handlebars, multi-gear ratios and special frames that may be too complicated for your purposes.

Total investment in a bike for an average person with average tranportation requirements should not exceed $100. After you're genuinely hooked, you can turn professional and become addicted to one of the super models that sell in price ranges up to $500 or more.

Try renting a bike before you buy one. Spend a couple of weekends pedaling various makes over typical terrain in your area; this tryout will answer many of your questions. Names of rental agencies are listed in the yellow pages of telephone directories or can be obtained from cycle shops. If you rent, try several no-shift models as well as geared models.

Find a reliable dealer with an established reputation and a service outlet. Rely upon his good judgment. With plenty of models to choose from, he can give you frank and honest advice. You can compare different models in the sales room and judge their relative qualities.

USED BIKES AREN'T ALWAYS a bargain. A good one will sell for about 75 per cent of the price of a new one. Be careful in buying a used bike from an individual. If it's too cheap, the bike probably has been stolen. Used bikes generally have no guarantee, so select a reliable dealer.

Where do you live? If your riding locale is flat or gently sloping country and you intend to use the bike mostly on weekend commuter trips for relaxation and simple errands, a three-speed commuter model should be satisfactory.

This type bike usually has upright handlebars, fender guards (great for wet weather), a comfortable conventional saddle seat, and a reliable "old fashioned" coaster brake. The coaster brake has several features: It's simple, requires little maintenance, and works well in wet weather.

If you live or work in hilly country, a three-speed job won't have enough gear ratio to push you over the humps in comfort. To climb the steeper grades without tiring yourself too much, you will need a bike equipped with a 5 or 10 speed system; such a unit usually costs more than $100.

YOU WILL HAVE TO GIVE UP the coaster brake, because the multiple gear rigging prevents any brake installation on the rear wheel. Dual wheel caliper brakes operated by hand and from the handlebars are standard equipment. In wet weather caliper brakes must be used cautiously. Apply them intermittently to keep the brake pads squeezed free of water and partially dry.

A cycling neophyte using his bike in hilly country could compromise on a five-speed job with a convenient gear shift device on the handlbar grip. The simpler models will give the newcomer a chance to acquire confidence. As his interest develops, he can grow into a sportier dropped-handlebar model, lighter in weight, with more gear ratios for cross-country trekking.

The bike frame must fit your body—you can't grow into it. Children should not use bikes that are too big.

A simple test will determine how tall you are in the saddle. Stand astride the frame, feet on the ground, with the seat elevated about two inches. You should be able to touch the ground with the ball of one foot, while the other foot is on an upraised pedal. There should be an inch or so of clearance between the frame and your crotch.

BIKE FRAMES ARE IMPORTANT. Lighter frames cost more. Cheaper bikes have welded frames; they aren't as strong as lugged frames. The latter are brazed so that the steel or alloy tubing can be thinner than the heavy steel requirement for welding. Alloy frames are light but expensive. The average biker can settle for a good lugged straight steel frame.

Women, older men, or families should consider a girl's frame style. It's easier to mount and can be adjusted readily to fit people of different sizes.

A wide variety of bike frame and handlebar styles is available for all age groups. These include the small 16-inch sidewalk bikes with coaster brakes and training wheels. The jet set among the young folks will go for the high rise handlebars, "banana" type seat, sissy bars, floral design saddles, chrome plated fenders, and other deluxe features. Similar deluxe adornments are also available for adult size bikes with the 26-inch wheels.

Pedal style influences peddling ease. Experts advise against using plastic ones—they are too slippery. Three-speed bikes usually have rubber pedals, which are satisfactory. Multi-gear bikes generally use rat-trap pedals, made of light strong metal, with a serrated surfAce for footgrip. For cross-country cycling, experts recommend rat-trap pedals with a "cage" to capture the upward thrust of your leg.

Bikes are also popular with people who don't own one; they steal over 400,000 yearly. Protect your bike by registering the serial number with the local police department.

Buy a good lock. Get a case-hardened steel, plastic covered cable to go with it. Don't use combinations locks—hammers will open them. Kryptonite locks are almost steal-proof. Fasten the bike to a parking meter or a solid post or bicycle rack. Loop the cable through the wheel and around the frame.

INSURE YOUR BIKE separately if it isn't covered in your standard homeowners policy.

Bike riders must observe all traffic laws. Local regulations specify the lighting equipment required for night riding. A white beam light is required in front and adequate reflectors in the back. Amber reflectors fastened to wheel spokes, bicycle frames or pedals increase rider visibility.

Like skiing you'll find that better cycling opportunities are located in rural areas. You can transport your bikes to a distant site by installing a bike rack at the rear of your car. Models for one or more bikes are available at modest cost.

You can do much of the simple bicycle maintenance once you buy an inexpensive wrench set. Ask your dealer how to use it. For the fussier jobs, take the bike to a reliable service outlet, preferably at your dealer.

Keep abreast of cycling activities and helpful workshops in your area. Become an active member of a local club or join the Bicycle Institute of America in New York City, which publishes many helpful booklets. Other national groups with effective educational materials include the 4-H clubs in the Extension Service, and the National Safety Council in Chicago.

Municipalities, counties, States, and the Federal Government are concerned with building bikeways for the exclusive use of cyclists.

"Instant" bikeways are created by closing off access roads in metropolitan parks to automobile traffic. Scenic or historic bikeways take advantage of unusual attractions. Urban bikeways provide pleasant excursions in the quieter sections of metropolitan areas.

Several bikeways have been developed by the Federal Government and others have been added to the National Park System.

The Federal Highway Act of 1973 allotted $120 million for bikeways over the next three years and establishes an educational program for bike rider safety.

Hanggliding

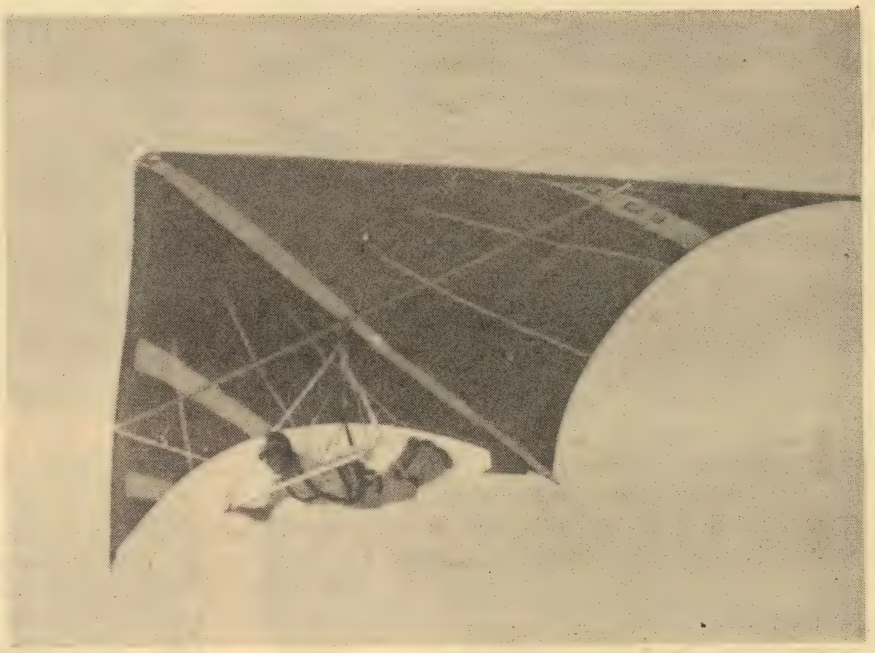
Silently the orange and blue man-made bird glides through the air. For up to two or three minutes the spindly looking man can pretend he's a bird, held aloft by his billowing "kite".

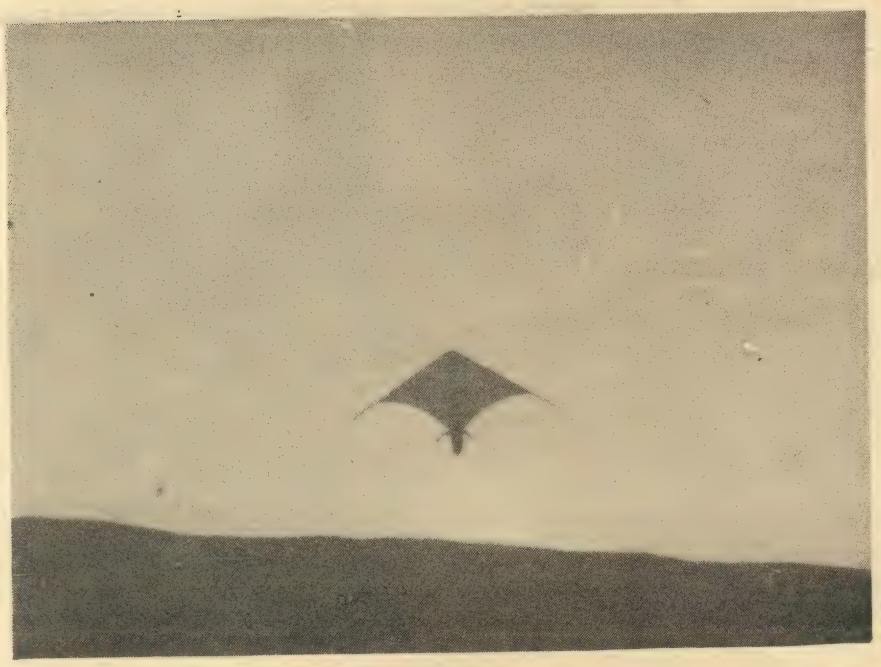
Hang gliding is perhaps the least environmentally detrimental of all sports. It produces no noxious gases, doesn't harm wildlife, doesn't require large areas of cleared ground, nor destroys any ecological balance. All hang gliding produces is great feelings of freedom in its participants.

According to Richard Kingrey, owner of Sky Unlimited Hang Glider Supplies and the southwest Missouri area's pioneer in the field, the sport of hang gliding is becoming more popular in this region.

The gliders themselves, called kites, are relatively inexpensive (about $250 and up) and Kingrey says all else you need is a little training and a hill. He trains students on a $25-and I promise-to get-you-into-the-air deal. Kingrey said he can usually get someone fying in two days. From there, it takes lots of practice to get the techniques down.

As vulnerable as these flying men look, Kingrey says that if you don't try to go beyond your ability and use sense, gliding is fairly safe. In his teaching of hang gliding, he's had one student break an arm, another sprain an ankle, and aside from minor bumps and bruises, that's it.





Most of the gliding enthusiasts in the Joplin area are men between 18 and 30 years of age, but Kingrey relates that about one out of every 5 to 8 students he trains is female, and that he has put people from ages 9 to 55 into the air.

Wings and Associates is the local hang gliding club which consists of about ten members. The fliers often spend their weekends in Cardin, Oklahoma, flying from the chat piles there Other favorite area spots are Magazine Mountain in Arkansas, and Buffalo Mountain in Oklahoma.

The kites have average wingspreads of about 25 feet, yet can be folded down into a package small enough to stick into your Pinto. Kingrey is the local distributor for three different manufacturers of hang gliders, and carries a complete line of supplies for the do-it-yourselfer.

Until they're so exhausted they can't go on, the fliers will clamber back to the top of the hill each time they touch down, trying to get in as many flights as they can. "Why do they do all this," one may ask, and the answer is returned, "For a little bit of freedom."

State of the Land

The Ozarks region of southwest Missouri has some of the cleanest air in the nation, but unfortunately, there are other parts of the state which have the some of the dirtiest. Each year, air contaminant sources in Missouri pollute the air with about two million tons of carbon monoxide, 1.2 million tons of sulfur oxides, 222,000 tons of particulates, 450,000 tons of hydrocarbons, and 490,000 tons of nitrogen oxides. Most of this pollution is concentrated in the major metropolitan centers but many rural areas are affected as well. It therefore becomes vital that all Missourians control air pollution, not only to improve the quality of life in our cities, but also to protect the regions that are already virtually pollution-free.

If you have not visited Los Angeles or some other large city in recent years, air pollution probably doesn't mean much to you. The eye-stinging pollutants in the air may be as foreign to you as the names of some of the pollutants and yet for millions of Americans air pollution is very real. If little is done to combat it now, it will be a fact of life in the Ozarks in the very near future.

Missouri Air

Missourians have been concerned about air pollution for many years. St. Louis passed its first smoke ordinance as early as 1893. Both St. Louis and Kansas City began extensive air pollution control efforts in the late 1940s.

State involvement began in 1965 with the passage of the Missouri Air Conservation Law. The law set up the Missouri Air Conservation Commission as the official state agency for "prevention, abatement, and control of air pollution by all practical and economically feasible methods." State reorganization in 1974 made the agency a division of the new Department of Natural Resources.

The Commission itself is comprised of seven members, appointed by the Governor and serving without pay. Alton L. Jones of Joplin serves on the commission as an industrial representative. No more than four of the commission members may belong to the same political party. Three members represent agriculture, industry, and labor repsectively, with the remaining four members representing the general public. This is designed to free the Commission from the pressures of partisan politics and special interest domination, yet enables it to examine air pollution problems from different viewpoints so that the best solutions can be devised.

WHILE THE COMMISSION GENERALLY meets once a month, the day to day operations of the agency are carried out by the staff in Jefferson City, under the direction of the Executive Secretary. The staff consists of about 25 persons, including administrators, laboratory technicians, chemists, engineers, inspectors, clerical personnel, a biologist, and a public information officer. All staff psositions are included in the state merit system and are not subject to partisan political influence.

BecausE the most severe air pollution problems occur in the larger cities, the Commission grants "certificates of authority" to local governments that wish to maintain their own control programs, if those governments have sufficient finances and personnel. These local agencies must adopt and enforce regulations, and a certificate of authority may be withdrawn at any time if an adequate program is not maintained. Local agencies presently exist in Kansas City, Independence, St. Louis, St. Louis County, and Springfield-Greene County.

The Missouri Air Conservation Commission monitors the air to determine how Missouri's air quality compares with state and federal standards for the major pollutants adopts regulations to control emissions from the sources of air pollution and enforces those regulations.

Air monitoring is carried out by the MACC staff. The staff maintains a network of about 70 sampling stations located throughout the state. Most of these stations are operated by volunteers, who are paid nothing for their services other than the satisfaction of helping achieve cleaner air. Many additional sampling stations are operated by the local agencies in the major metropolitan areas.

Not all of the stations are alike, since different sampling techniques and equipment are required by different areas. The MACC staff also maintains a pair of mobile sampling trailers, each of which is equipped to sample a number of different pollutants. Data obtained from the sampling network is published in semi-annual "Air Quality Reports."

REGULATIONS TO CONTROL the sources of air pollution are adopted by the Commission, with the staff responsible for enforcement. Present regulations control automobile emissions; restrict open burning; control the use of incinerators; restrict emissions of sulfur compounds, visible air contaminants, and particulate matter; and restrict odors.

APOLLO 7 EARTH-SKY VIEW — This view of southern California was taken by the crew of the Apollo 7 spacecraft during the 17th revolution of the earth. The coast of California can be seen from Santa Barbara southward to La Jolla. Details of the metropolitan Los Angeles area are obscured by pollution. The Mojave Desert is in the background.

A particularly important regulation is one which prohibits construction of any new contaminant source, or modification of an existing source, without first obtaining a permit from the MACC. No permit is issued if the staff determines the source would violate any of the regulations.

Enforcement of the regulations is accomplished by air pollution control specialists, engineers and inspectors. Air pollution offenders first receive a violation notice, which is simply a warning that a regulation has been violated. If further violations take place, the Commission will issue an abatement order. Violation of an abatement order can result in court action and penalties of up to $5,000 a day against the offender.

Most air pollution violators realize they will be forced to comply sooner or later and do not wish to carry their problem as far as a court case. When a violation is discovered, company and MACC representatives work together to eliminate the problem. In all stages of the enforcement process, the MACC staff is available for consultation and to provide expert opinions on what control measures are needed.

Air pollution problems can't always be solVed overnight. Control equipment is often very expensive and usually must be custom-built for each particular installation. In some industries, sufficient technology has not yet been developed to adequately solve the problem. For that reason, the Commission can grant "variances" to industries, giving them additional time to comply with a regulation.

TO OBTAIN A VARIANCE, a firm must submit a "compliance schedule" describing the actions it will take to comply with clean air requirements. The compliance schedule lists the types of control equipment that will be installed or describes the changes a firm will make in its internal operations to eliminate the pollution problem.

Variances are never granted for longer than a year. If an industry needs more time than that, the Commission reviews the firm's progress before considering a variance extension.

Variances have become particularly important as a method of dealing with the recent energy crisis. When clean fuels are in short supply, the Commission can grant variances to firms which cannot obtain sufficient clean fuels, allowing them to temporarily burn dirtier fuels. Firms receiving such a variance must agree to switch back to the clean fuels when the supply improves. If it appears that the shortage will be permanent, the Commission can require a company to use a different control method.

The variance process gives the Commission flexibility to help firms that really need it, without relaxing clean air regulations and public health safeguards.

Air pollution in southwest Missouri may not be a crucial problem at the present time, but unless one takes safeguards to preserve the present the future may be in jeopardy.

Snakes -- Friendlier Than You Think

Of all the reptiles in the world, the snake, throughout recorded history, has been the most feared and respected of all. Often portrayed as being silently deadly, mysterious, and evil, snakes do, in fact, play an important role in helping maintain the balance of nature. Unfortunately, most of us have grown up with a number of misconceptions and unfounded fears of snakes, but it is natural for man to fear what he doesn't understand.

There are about 1,000 known species of snakes that inhabit the earth, and are more abundant in the Tropics, where they also attain their maximum size. All are carnivorous, and consume their prey whole. In the United States, there are about 100 species, and only 19 are dangerous to man. The 19 are of three types: the rattlers (15 species), the moccasins (two-species—copperhead and water moccasin), and the coral snake (two species).

With the exception of the coral snake, which inhabits the extreme southeastern part of the United States, the rattlesnake, copperhead, and water moccasin are of the pit viper (Crotalidae), family and their venoms are hemotoxic in nature. A bite from one characteristically leaves the two large puncture wounds from their fangs which causes an almost immediate swelling at the bite site, followed by a purplish discoloration. Shock usually develops soon afterwards, accompanied with weakness, dizziness, nausea, and pallor. The coral snake, unlike the vipers, have no fangs in which to inject poison. They must chew on their victims with tiny teeth. However, this does not make them any less dangerous. On the contrary, the coral snake has often been referred to as the "little cousin" of the deadly cobras of Africa and Asia because he injects a neurotoxic type of venom that interferes with the nervous system. After being bitten, there would be an excruciating pain at the bite site with a lack of swelling. This is followed by a series of locomotor disturbances, a gasping for breath, and a blurring of vision. In the case of both types of venom, immediate hospitalization is required. How much venom gets into your system and your physical conditioning are the prime factors determining survival and recovery.

THE WORST THING a person can do after being bitten by a poisonous snake is to drink alcohol. This simply speeds up the action of the poison, making survival more difficult. We have been treated, for a number of years, with western movies that portrays the leading character jabbing knives into the bite sites of ladies in distress, and sucking the poison out. In actuality, by utilizing this method of first aid, an individual is taking a chance of poisoning themselves if they have open sores in their mouths, or cuts on their lips. The best first aid a person can give to a snake bite victim is to immobilize the part bitten, and get them to competent medical facilities as soon as possible, keeping the victim calm and giving him plenty of water. Most doctors today even frown on people using snake-bite kits because too few individuals can make the proper incisions or use a suction pump.

The most logical precaution an individual can practice is just plain common sense. The only time snakes bite humans is when they have either been startled in their natural habitat or antagonized. Nature has provided them with perfect camouflage, so naturally, they will be difficult to see. Snakes are naturally shy, and will avoid a confrontation if they are given the chance. Another important point to remember is that snakes can strike about the length of their bodies, so keep the proper distance. While in the woods during the spring and summer, always watch where you place your hands and feet, and never sit down until you have surveyed the area first.

A number of societies throughout history have worshipped snakes, but one of the most interesting and picturesque religious ceremonies utilizing snakes is the "rain-making" dance performed annually by the Hopi Indians of Arizona. The snakes they use are of all kinds, including rattlesnakes. Each dancer takes a reptile and holds it by the neck in his mouth. The dance is accompanied by rhythmic wailing of priests. The dance is a fascinating spectacle, and lasts an entire afternoon. At its conclusion, the snakes are turned loose.

RATTLESNAKES, COPPERHEADS, and water moccasins are found in the Ozarks, although it is a rarity to see a rattlesnake. They prefer the arid regions of the southwest. Occasionally, though, one is found. Copperheads and water moccasins are the most prevalent venomous snakes and are widely distributed throughout the Ozarks. Although their bites can be lethal, actual bites are rare, a fact which attests to the snakes shyness.

The copperhead is marked a beautiful coppery red and brown, and usually grows to about three feet in length. The head is typically identified by its "hog-nosed" shape peculiar to all pit vipers. The water moccasin can be identified with its ruddy brown color above with darker bands, and black below with whitish markings. When they open their mouths, it looks like a ball of cotton, hence the name "cotton mouth." They grow to about three to four feet in length and have a thick body that tapers at the tail. In the Ozarks, when an individual is around water in the woods, they can assume they are in moccasin territory.

Venomous snakes are responsible for giving the entire family a bad name. The majority are harmless, and in general, useful. The Ozarks have their share of these non-venomous snakes, the most common being the tiny garter snake. The garter snake is small and slender with the characteristically small rounded head common to all North American Non-poisonous snakes. There are no specific markings on the garter snake. Some are solid colors, to blend with the background, some are spotted, and some may even be banded. It all depends upon the area they inhabit. All are small, rarely reaching the length of one foot. This is the snake that usually ends up in the pockets of little boys or in teacher's desk drawer during the spring of the year.

ANOTHER NON-POISONOUS variety that inhabits the Ozarks is the king snake. He has been called the farmer's friend because of the large number of mice they consume and they are the natural enemy of all poisonous snakes, often killing and eating them. They range in size from three to six feet in length and are usually dark in color with orange and white markings.

The clown of the snake family, one that inhabits the Ozarks, is the hog-nose. He enjoys an evil reputation, yet he is completely harmless. Often referred to as the "hog-nosed," "spreading adder," "blow snake," "blowing viper," and "puff-adder," the snake is supposed to be able to blow venom from a distance into its victim's eyes. This, of course, is all untrue, and it comes from the way the snake acts when molested. It puffs itself up when approached, lunges with an open mouth, and hisses—but it never bites. If all this fierce behavior fails, its next bluff is to die before your very eyes—even to writhing and turning over on its back. In captivity, it makes a fine pet.

Snakes are good hunters, but the most amazing aspect is their feeding habits. They are capable of engulfing food larger than their on head. This is accomplished by the lower jaw, which is divided into two separate parts that are joined at the chin by an elastic tissue. Each lower jaw is attached to the corresponding upper jaw in such a way as to permit the snake to stretch its mouth wide enough to engulf animals much larger than the snake. The teeth are shaped like curved needles that point backwards. By moving its jaws alternately, food is slowly worked down the throat.

DIFFERENT SNAKES use different methods to overcome their prey. Some, like the garter snake, simply grab a frog or mouse in their mouths, and swallow it. Others, like the king snake, coil around their prey and crush them to death first before devouring it. Poisonous snakes inject venom into their prey. After they die, they consume them. Swallowing poisoned prey does not hurt them; in fact, venom contains an enzyme that aids in digestion.

Although poisonous snakes have given a bad name to all snakes, they have made contribution to science and medicine. Scientists have discovered a number of uses for the toxins excreted from venomous snakes, the most important being the antivenin utilized by hospitals in treating snake bite. Once the poison is extracted, or "milked," as it is called, it is injected into horse's blood. From that extracting comes the antivenin.

Most of all though, snakes contribute to our national economy by the large numbers of insects, mice, rats, and other pests they consume each year. It behooves us all to leave them alone and allow them to go their way in peace. You are doing yourself a favor by not antagonizing them, because if you do, and they are of a poisonous variety, you are asking for trouble. On the otherhand, if it is a harmless snake, it's probably useful, and destroying it would be a mistake. Their role in the balance of nature is as important as the other wild life that makes up a well balanced ecosystem.

Endangered Species

Never before in recorded history have the world's wildlife faced such a desperate crisis. We are now at the point in time when the destiny of numerous species is being determined.

In 1972, the Missouri State Legislature passed an act charging the Department of Conservation to establish a list of, and provide protection for endangered fauna of Missouri. The word endangered is defined as one whose prospects for survival within the state are in immediate jeopardy. This my result from one or many causes such as; loss or change of habitat, over exploitation or disease. Wildlife must have help or expiration will take place. According to Robert Mountjoy, area conservation agent the following are rare and endangered fauna of Missouri: black bear, spotted skunk, red wolf, white-tailed jack rabbit, black-tailed jack rabbit, sharp skinned hawk, coopers hawk, red shouldered hawk, marsh hawk, golden eagle, bald eagle, osprey, peregrine falcon, greater chicken, king rail, virginia rail, upland plover, and alligator gar.

IF THE WILDLIFE of America and the world is to be saved, man must quickly realize that it is in his selfish interest to do so. The loss of a species diminishes the world's beauty, variety, and diversity. Like a pricesless painting or a work of art each animal species is unqiue and cannot be reproduced. As the late conservationist William Beebe observed, an extinct animal can never be re-created; to bring it back, there would have to be another Creation, a new Heaven and Earth. A world without wild animals would be a bleak and lonely place for man; and this increasingly likely prospect, once attained, would be irreversible.

As human beings are part of nature, we are bound by its laws. We ignore this fact at great risk to ourselves, for eventually we will certainly destroy a species or ecosysytem essential to our own survival. Man alters animal communities as he goes about remaking the face of the earth to suit his notions or needs. He cuts down the forest, and immediately the animal life dependent on the woodland must move out or perish. He plows the grasslands and the same alternatives confront their animal populations. When he drains the marshes and lakes, the marsh birds fly elsewhere and the aquatic life dies.

One obstacle to the proper handling and utlization of wildlife is often found in the attitude of hunters and fishermen who desire to take more fish or game than the crop available for harvest, regardless of the condition of the breeding stock. When man utilizes a wild species for game, food or commercial purposes, that species is immediately subjected to a pressure that adds to its difficulties in maintaining existence. The ultimate effect of this added pressure is often greatly to reduce the population of the game or food species, not only in comparison with other forms, but also in total numbers.

In 1975, Lewis Regenstein, the executive vice president of the Fund for Animals in Washington, D.C. published a book called "The Politics of Extinction." In this book he gives us the names of those he considers responsible for wiping out our wildlife heritage; companies such as the fur industry, hunters and trappers, and in some instances cited our governments actions or inaction that jeopardized the survival of wildlife.

ACCORDING TO REGENSTEIN, it is thoroughly documented that over the years hunters have been responsible for helping wipe out numerous species of wildlife. Pollution, destruction of habitat, and other factors have also helped push countless species to the brink of extinction. After holding extensive earnings over a two year period, the Senate Commerce Committee in mid-1973 issued a report recommending a new legislation to protect endangered species. It stated that "the two major causes of extinction are hunting and destruction of habitat."

Although in David W. Ehrenfeld's book, "Biological Conservation," he points out that hunting, if properly regulated, is primarily a conservation activity. It serves to control the population sizes of animals such as deer, squirrels, and rabbits that would tend to multiply excessively in the absence of their original predators. Hunting provides revenue to run many government conservation activities. Most important, good hunters are familiar with natural environments, recognize both their unique value and precarious balance, and are often eager to work as a group to prevent them from being ruined. In an increasingly urban world, game hunters form an essential link between the natural earth and the constructed earth.

As for the causes of extinction, perhaps the greatest present threat to wildlife is the drainage of swamplands and wetlands, destruction of the land by strip mining, channelization of streams, clear cutting, road building, and the striping of forests. An equally serious threat is the mounting problems of pollution that is fouling the air, despoiling the land, poisoning our lakes, streams, rivers and even oceans. Another threat to wildlife is the exploding human population, which is crowding out all other forms of life and making impossible demands on the earth's life-suppport system.

MANY INTERNATIONAL ORGANIZATIONS and societies are working desperately to save the world's endangered animal and National Parks and Nature Reserves are store houses and gene polls for plant and animal species that prove important for human welfare. Wildlife refuges also have a definite place in the conservation field. Their principal function is to preserve wildlife. They may vary in size from a few acres to vast stretches of country depending upon the habits of the species involved. Our national Wildlife Refuge has grown to 356 such havens located in every state except West Virginia, totaling more than 30 million acres and sustaining almost every kind of wildlife, game and non-game.

As Roger Caras points out in his book, "Last Chance on Earth," man at this point in history is deciding whether or not he shall share this planet or shall inhabit it alone. We are about to commit ourselves once and for all either to a planet rich in wonderment and beauty, or to a planet that is a mockery of itself, drenched in poisons, littered with metal junk heaps, and stripped of timber....

This is mankind's last chance on earth. From here on, the world will be a heaven or hell of our own choosing.

Wild Animals of Missouri

More than 100 animals in the United States today are officially considered threatened with extinction. These animals appear on the official list of endangered native fsh and wildlife maintained by the Department of the Interior.

Most persons have heard the phrase "endangered species," but the exact meaning is not always clear. An endangered species is simply one whose existence is threatened. Its chances of survival and reproduction are in immediate peril. This crisis situation can come from loss of living space, change in habitat, over exploitation, disease, pollution, and predation. If an endangered species does not get help, it will probably disappear forever.

"Much of our wildlife is in good shape," says Thomas L. Kimball, executive vice president of the National Wildlife Federation. "Good conservation practices have helped. But too many are in real danger. An endangered species does not have to become an extinct one. Most endangered wildlife can be saved, but it will take a big commitment from us to do the job."

SINCE THE WORLD'S beginnings there have been animals (like the great dinosaurs) that had their time on earth and then disappeared. Far back in time, extinction was a slow process, taking place over thousands and millions of years.

But now changes come much more rapidly. Estimates are that in North America alone almost 40 different types of mammals and birds have vanished in the past 150 years. Man, with his capacity to speed up environmental change, has speeded up the rate at which some wildlife has been lost.

Today, endangered species can be found in over 40 states. The total stands at 109. Among them are the whopping crane, the tallest bird on this continent; the California condor, the largest land soaring bird in North America; and the American peregrine falcon, what many consider the fastest bird on the continent, at 180 plus miles per hour in a dive.

Wolves once had the greatest geographical distribution of any land mammals on this continent. In North America there are 24 recognized subspecies of the timber wolf. Two of these subspecies, the eastern timber wolf and the northern Rocky Mountain wolf, are on the endangered list. The red wolf, considered a separate species, is also endangered. All three are nearly gone from the continental United States.

THERE ARE SOME SIZEABLE populations of various species of wolves in Canada, including some of those on the United States endangered list. Estimates vary for Alaska which may have up to 5,000 wolves, although none of the subspecies on the endangered list are found there.

But in the United States, outside of Alaska, there are probably only 1,200 wolves left and this is an optimistic estimate. Wolves now occupy less than one per cent of their original range in the lower 48 states.

When settlers came to America, they brought with them some truly wild ideas about wolves. Over the centuries, wolves came to be known as "big, bad" vicious killers.

Wolves do kill. They must kill to eat. They feed primarily on large animals including moose, deer, elk, bison, and caribou, and mainly on the young, the old, and the infirm, because they are the easiest to catch. In this way, the wolf helps to keep populations of the large mammals at a stable level.

HABITAT DESTRUCTION and environmental degradation continues to threaten our endangered wildife. The southern bald eagle became endangered partly because of the loss of nesting sites and decline in reproduction probably caused by pesticides. The American peregrine falcon population has suffered because of pesticides. The black-footed ferret's main food source is prairie dogs and as prairie dog towns were cleared out to make room for grazing livestock, the ferret has been pushed closer to extinction.

The ivory-billed woodpecker, listed as endangered but possibly already extinct, declined primarily because of the disappearance of overmature forests. These forests harbored the wood boring beetle larva that is the woodpecker's food source.

In 1966 Congress passed the Endangered Species Preservation Act, officially recognizing a national responsibility to protect threatened wildlife. It directed the Secretary of the Interior to publish a list of animals threatened with extinction. The first list, issued in 1967, named 78 animals.

The 1966 Act also authorized funds for research to preserve endangered wildlife and acquire new habitat areas for them. Research is being conducted at the Interior Department's Patuxent Wildlife Research Center in Laurel, Maryland. Here ways are being found to propagate certain species in captivity for later return to the wild.

People ask what they can do to help endangered wildlife. This is a hard question to answer. An individual's personal concern, however, can be of tremendous value. They can be saved, if a big enough public commitment is made, experts say. "If all of us care enough," Kimball noted, "and are willing to support public efforts to help endangered species, we believe these efforts will succeed."

Tornadoes

Tornadoes are short-lived, but in those brief moments of terror, they can be the most destructive weapon in nature's arsenal. It can destroy solid buildings, make deadly missiles of flying debris, uproot large trees, and hurl people and animals for hundreds of yards. According to records maintained by the United States Department of Commerce, in 1931, in Minnesota, a tornado carried an 83-ton railroad coach and its 117 passengers 80 feet through the air. Walking through the aftermath of a tornado is reminicent of the streets of Hiroshima and Nagasaki in 1945.

The actual destructive force of a tornado is the result of two distinct characteristics: wind and pressure. As tornado-velocity winds rip at the exterior of a house, the air inside the house expands explosively into the near-vacuum of the tornado vortex. This combined effect produces a near total destruction.

Just what sets a tornado off has never been established. However, scientists know for a tornado to develop, there must be a layer of warm moist air at the earth's surface, and a layer of cool air at a height of 3,000 feet or more; the greater the difference in temperature between these two layers, the greater the possibility of a tornado. The warm air begins to writhe upward with a north and east movement while the cold air turns downward with a south and west movement. As the whirling increases in intensity, more warm air is drawn up from below until the whirling winds attain a velocity as high as 500 miles per hour. As condensation occurs around the vortex, a pale cloud appears — producing the frightening tornado funnel.

The occurence of tornadoes is more prevelent in the spring and early summer months, but they can occur any time there is unsettled weather and are usually in conjunction with severe thunderstorms. As a thunderstorm moves, tornadoes may form at intervals along its path, travel for a few miles, and dissipate. The forward speed can range from almost no motion to as high as 70 miles per hour.

Unfortunately, the Ozarks lie in what scientists refer to as "tornado alley," Most individuals who live in this area have had some experience with this most awesome power of nature. Consequently, they have learned to respect them for what they are capable of doing and guard their families against the eventuality of one occurring.

An individual can do a number of things to enhance their chances of survival by not becoming a victim of a tornado. The National Oceanic and Atmospheric Administration of the United States Department of Commerce has compiled a list of Tornado Safety Rules of what an individual should do in case of a tornado:

IN OFFICE BUILDINGS —Go to an interior hallway on the lowest floor, or to a designated shelter area.

IN HOMES —The basement offers the greatest safety. Seek shelter under sturdy furniture if possible. In homes without basements, take cover in the center part of the house, on the lowest floor, in a small room such as a closet or bathroom, or under sturdy furniture. Keep some windows open, but stay away from them.

IN SCHOOLS —follow advance plans to an interior hallway on the lowest floor. If the building is not of reinforced construction, go to a nearby one that is. Stay out of auditoriums, gymnasiums, and other structures with wide, free-span roofs.

IN SHOPPING CENTERS —Go to a designated shelter area. (NOT to a parked car)

IN OPEN COUNTRY —Move away from a tornado's path at right angles. If there is not time to escape, lie flat in the nearest ditch or ravine.

MOBILE HOMES —Are particularly vulnerable, and should be evacuated when strong winds are forecast. However, damage can be minimized by securing trailers with cables anchored in concrete footings. Trailer parks should have a community storm shelter and a warden to monitor broadcasts throughout severe storm emergencies. If no shelter is available, leave the trailer park and take cover on low protected ground.

In recent years, most of the deaths and injuries have occurred in mobile homes, especially in the Ozark region. In 1971, a tornado swept through Joplin killing a young Missouri Southern student who lived in a nearby mobile home park. Again, in 1973, most of the injuries sustained by Joplinites in the May tornado were by those living in mobile home parks. Recently, in Cabin, Arkansas, most of the victims of that devastating tornado were those individuals living in mobile homes. Only a few weeks ago, in Diamond, Missouri, a farm community south of Joplin, a tornado slammed into the mobile home of an elderly couple, killing the man and critically injuring his wife. In the words of one spectator, who set helplessly watching the destruction, "it literally exploded, almost like someone had set off a bomb."

There are no escapes from natural disasters. We must accept them for what they are and learn to live with the knowledge that, "it could happen to me." Unlike Dorothy's tornado, which acted as a catlyst, propelling her into the Land of Oz, the real world of tornadoes is unforgiving. However, if we all follow the simple guidelines learned from previous tragedies, our chances of survival would be greatly enhanced. We can always rebuild our homes, but no one can replace a life.

Ponds Teeming With Life

It is night and on the surface the pond looks still. But below the rface this pond is teeming with life. An all out war for survival going on constantly. Crayfish wearing their protective arour search diligently for food. Snails, worms, and rotifers join the exploration for nourishment. Hundreds of tadpoles glide ffortlessly through the lightless gloom. Occasionally there is a dden splash as a large-mouth bass attacks an unsuspecting innow. As the bubbles from the charging assault disappear, ere is nothing but a quiet lull and darkness.

This could well be a description of the night life of the typical issouri pond. Nowhere on earth, with the possible exception of lt marshes and coral reefs, is life so concentrated. This great riety of life can only be fully appreciated by owning or at least siting a pond.

IT HAS BEEN ESTIMATED that there are over two million nds in the United States, and 300,000 to 500,000 ponds in issouri, that support some form of aquatic life. At every level such ponds there exist unusual forms of life that await to be bserved.

On the surface of every pond is a film created by molecules ear the top of the water. Existing on this nearly transparent oor are such small aquatic insects as the whirligig beetle and shing spider. Although they are rarely noticed, both are markably adapted to the pond.

FOR INSTANCE, the whirligig beetle has eyes consisting of o hemispheres, one of which is focused for vision in water and e other one for vision in the air.

The beetle also carries an air bubble with it that acts as a gill embrane that allows oxygen to pass from the water to the sect and allows the insect to expell carbon dioxide into the ater. This permits the beetle to remain under water for veral hours, until the nitrogen which makes up most of the air bble escapes, causing the bubble to collapse.

The fishing spider has an even more remarkable adaption for king in oxygen. Water-repellant hairs cover the spider and act trap air when the spider submerges. The spider can survive as long as one hour on this air supply.

ON THE BOTTOM SIDE of the surface film there exists even maller organisms. Snails, hydras, and water fleas cling to the m as they try to locate food.

The next zone of pond life stretches from just under the surce film to the bottom of the pond. Insects, leeches, diving cks, frogs, turtles, and fish inhabit this region of the pond.

One of the unusual, but frequent inhabitants of this zone, is the ving beetle. It has plates on its legs, which when stroking crease the surface area of the legs for more power, but when e legs are brought forward the plates collapse, offering little sistance to forward propulsion. Whenever an adult diving etle wishes to replenish its air supply it merely sticks its bdomen above tHe surface for a brief instant. A row of holes neath the wings allows oxygen to enter the beetle's tissues. he larvae of such beetles have holes (spiracles) located at the nd of their abdomens. To take in air the larvae simply hang in n upside down position near the surface. The larvae of osquitoes, gnats, and some flies breathe in a similar fashion.

THE FINAL LAYER of the pond and most densely populated egion is the bottom. In this layer there exists crayfish, worms, sect larvae, and many other forms of life, many of which can e observed only with a microscope.

With such a panorama of life it is no wonder people like William H. Amos, a biologist, spend much of their time at ponds. He has said, "Often my children and I walk to the pond and ause on its bank to observe its wonders."

Joel Vance of Conservationist magazine said of ponds, "A ond is....is....a good place. Yes, that's it. In the same way that a all grass meadow, billowing in a spring wind is a good place. In he same way that a shrub-shrouded spring pool, dark and estless, overhung with a gnarled, wiry old cedar, softened by he gentle blossoms of Dutchman's breeches and bluebells is a ood place."

MIKE BUSTER, a student at Missouri Southern who fishes rea ponds, commented "I prefer pond fishing to lake fishing ecause at ponds there are no contests and you don't see nybody. They are close and fish are easily accessible to pond anks." Buster hopes to own a farm someday. He also hopes to uild a pond there where he can stock an assortment of fish.

For fishermen like Mike Buster, the best thing about a pond is that it can be stocked with both warm-blooded and cold-blooded fish. In order to be suitable for this the bottom must be contoured similarly to the bottom of a swimming pool. One end should be approximately three to four feet deep and the other end should be shaded with depths reaching at least ten feet. This type of construction will facilitate perch and bass in the shallow end, where during the summer temperatures will reach into the eighties. The deep end should stay below fifty degrees where trout can be stocked.

In the ideal pond there would be some big fish, an even larger number of medium-sized fish, and a still larger population of small fish. Fishermen should try to take a few of the big fish, and more of the medium and small-sized fish. This helps keep the fish population in balance.

Obviously, ponds are an extremely valuable asset to the environment and to people. Ponds help support the environment by helping to keep the water table up and by giving many forms of aquatic life a place to thrive. By their doing this, the delicate biological cycle is kept in balance.

For people, ponds offer a great variety of life to study. They offer a place for fishing and swimming in the summer time and a natural rink to try out skates in the winter. They offer a retreat to be alone on a warm autumn day when the sugar maples have turned a firey red. These life filled bodies of water are indeed some of Missouri's most valuable possessions. Ponds are truly a bargain at any price and he that has been able to savour any of the real beauty of them is truly lucky.

Tale of Two Creeks

It isn't a great idea for fun, say, like going to Galena, but in this biology course it well may be the only "fun" you can have—wading hip high in a local stream. Yes, for credit. No, in the daytime. Yes, when it's hot or cold outside. Yes, sometimes when it's raining (and the boot is filling with water as fast as you can dip it out with a coffee can).

This isn't the first time that Environmental Biology has been taught at Missouri Southern State College. However, the instructor—or whatever you call him when you're soaked with water—had enrolled himself (and subsequently used us) in a National Science Foundation Chautauqua-type short course at Kansas City and was trying to get points with the NSF instructor and with Dr. Ferron, the biology department head at Southern. The course involved a case study in environmental impact.

We were "organized" into three research groups from those enrolled in the Environmental Lab (Biology 314). In November our counterparts in the lecture only (Biology 312) were divided into three groups. One of these groups was assigned to each research group to act as the public "buffer," ready to put the "environment first" flames out if such was necessary.

Three areas were chosen: (1) Center Creek in the area north of Webb City; (2) Turkey Creek near the new tertiary treatment facilities at the Turkey Creek (Lone Elm) Sewage Treatment Plant; and (3) a rather pastoral setting on Jones Creek, a branch of Center Creek, east of Fidelity which may bear some weight if or when the Prosperity Reservoir is ever built on the main stem of Center Creek just downstream from the study site.

Really, things were going smoothly and panic had not set in. But on November 10 and 11 of 1975, Dr. Jerry Elick, our instructor, went to Linda Hall Library near UMKC and apparently came back with the NSF-EPA spirit. This is when we were told to have our project reports ready (panic sets in now) by finals since he wished to show them to Dr. Murray Felsher, director of the sessions, and the other participants. Dr. Felsher was recently with the U.S. Environmental Protection Agency and is now with the National Aeronautics and Space Administration where he does research with remote sensing satellites. These constantly scan the surface of the earth for various resources and conditions.

The outstanding features of our research were: (1) Tertiary treatment does improve the quality of water in Turkey Creek below the plant as compared to previous treatment when tertiary treatment is not available. The input containing a variety of pollutants of the plant is greater than the flow of natural water in Turkey Creek during most of the year (compared to a huge dilution factor of the Shoal Creek Plant as it gives off chlorinated treatment water to Shoal Creek in the south end of town).

(2) Center Creek is polluted with some Organic material, a great deal of heavy metals from the old mines fields, and some industrial wastes. However, there are still fish there, and a rubber tire swing vouches for the use of the "old swimming hole" at Oronogo. Also, the Jones Creek portion of the Center Creek watershed appears to be in good condition showing that application of agricultural substances and septic tank seepage is the lesser of the evils encountered.

Generally speaking, living organisms are the best "sensors" that we have available and the use of these as indicators is in line with current EPA practices. After all, it's life we're trying to protect (us, too).

Those of us who worked in these projects used our own sampling data, data from previous classes in other years, newspaper articles, government documents, and considered several aspects of the problems. Physical, biological, social, economic and aesthetic factors were studied. One group even had access to an airplane for some observations of Center Creek. One previous class had access to a plane for observations of Turkey Creek watershed elements.

P.S. On March 22 Dr. Elick presented the results to the Chautauqua group in Kansas City at Linda Hall Library. He opted to use the Turkey Creek report as a model. Few people realized that any city in the area already had tertiary treatment. Teaching problems, ideas and solutions using the case study approach were discussed.

Those of us who participated included: Steve Wieneke, Mike Travis, Sharon Plummer, and Fred Dalton, research team; Charlene Sale, Tricia Pahlow, Jamie Baysinger, Pam Lankford, and Jo Ann Lyttle, "buffers;" Larry Alderson, Joe Dabbs, Charles Neidert, Bob Herrell, and Deonne Johnson, research tram; Leon Witt, Bonnie Weston, Pat Thompson, and Bill Stogsdill, "buffers;" Nick Johannes, Pat Flynn, John Scott, Pat Wright, research team; and Charlene Schamberger, Karla Millsap, Gary King, and Kathy Hadley, "buffers."

The American Indian Movement

The illustrious Phil Sheridan, of Civil War fame, thought and said that the only good Indian was a dead one. This was probably the most common philosophy of that time toward Indians. And there was always a heated rivalry between the cowboys and the redskins.

Today we can see the same two sides facing off on Monday night football.

But the discord that lies between the White American and the American Indian today is no joking matter. The U.S. Census Bureau's 1970 report shows Indian population growing four times as fast as America's population as a whole. The report notes that Indian population has more than doubled since 1950, when there were 343,410 Indians. In 1960, there were 523,591, and in 1970, there were 792,730. The booming Indian population suggests that reservations may be becoming more crowded and this factor points to growing pressure from Indians to expand.

IN AUGUST OF 1971, Mrs. Richard Nixon was heckled by American Indian Movement members, when she appeared in Minneapolis to turn over 141 acres of prairie on Fort Snelling for use as Minnesota state park area. The hecklers claimed the land was Indian territory, citing a government treaty which stated that all Federal land which is no longer in use goes to the Indians. This incident was neither the first, nor the last in which the AIM contested land rights and flaunted broken treaties.

In June of 1971, The Associated Press in Hill City, South Dakota reported that 20 Indians were being held for setting up camp atop Mt. Rushmore. Nine men and 11 women were charged with climbing the monument, a misdemeanor. Some of the demonstrators had to be carried down the mountain, the authorities said.

Wallace McGraw, memorial superintendent, said he had sent 50 rangers and deputies to the top of the Black Hills landmark after the Indians refused to leave.

The AP article cited that the Indians moved onto the memorial about dawn after issuing statements that they would not leave until the Federal Government agreed to demands that an 1868 Sioux land treaty be honored.

THE SIOUX TREATY of 1868 declared that all land in South Dakota west of the Missouri River, which almost splits the state north to south, belonged to the Indians.

Dee Brown, head librarian at the University of Illinois, and author of "Bury My Heart at Wounded Knee", wrote in an article for the New York Times; "...if we judge from the past, the Black Hills would be much safer in the care of the Sioux than under Government management. After all, the Black Hills are Sioux territory through the treaty of 1868, and it would be especially fitting for Custer State Park to be protected by Indians."

In November of 1972, about 500 American Indians, led by members of the Caravan Trail of Broken Treaties and the AIM, after scuffles with Capitol police outside and inside the building, seized control of the Bureau of Indian Affairs building to protest Government injustices against Indians. According to the New York Times, the Indians agreed to leave the BIA building after 5 days of occupation, having reached an accord with White House negotiators on a broad program to hear Indian grievances and proposals for economy, education and social aid.

Further evidence of Indian dissatisfaction with their treatment and living conditions came in February of 1973, when Dennis J. Banks, a Chippewa Indian, and Russell C. Means, a Sioux, led about 300 other Indians into the tiny Indian hamlet of Wounded Knee,—the site of a massacre of Indians by soldiers in 1890—and held the village for 71 days to protest Government treatment of Indians.

During the occupation, two Indians were killed and three federal agents were injured.

THIS INCIDENT WAS COVERED in a special article to the New York Times by Martin Waldron, who reported that after the occupation of Wounded Knee was over, Banks and Means each faced three counts of assault on Government officers, one of conspiracy and on of larceny. Each could have been sentenced to up to 85 years imprisonment.

Waldron cited that in the ensuing trial, Federal Judge Fred J. Nichol dismissed the charges against Russell Means and Dennis Banks on grounds of misconduct by the Justice Department. Federal prosecutors and the FBI, Judge Nichol charged that the Justice Department, by refusing to allow 11 members of the jury to decide the case after the twelfth had become ill, appeared to be more interested in "convicting Indians" than in justice. Earlier in the trial, the judge said in front of the jury, "The FBI has certainly deteriorated."

According to Waldron's article and other "Times" articles, U.S. Attorney General William B. Saxbe ordered a Justice Department study of the Wounded Knee trial of Banks and Means, in light of the dismissal of charges by Judge Nichol. But seven jurors and three alternates who heard the Wounded Knee case sent a letter to the Attorney General asking the Justice Department not to appeal the dismissal of charges against AIM leaders Means and Banks. The jurors also asked Saxbe to dismiss charges against 90 other persons awaiting trial for their role in the seizure of Wounded Knee.

In light of the jurors' plea to the Justice Department, one may be brought to the conclusion that pursuing the Wounded Knee issue further could only be futile, but in July of 1975 another trial was set in Custer, South Dakota for Russell Means, which did little more than rile local AIM members to new violence.

ON THE PINE RIDGE RESERVATION in South Dakota, two FBI agents and one Indian were killed in a shootout in late June. The State Attorney General was on the scene in half an hour, and state troopers assisted Federal Agents and Bureau of Indians Affairs officers in the insuing gun battle, even though the state has no legal jurisdiction over Indian reservations.

Grace Lichtenstein, in a special article to "The New York Times" noted that when South Dakota Attorney GenerAl, William Janklow, was asked whether he had authorization to be on the reservation, he replied, "I do not need authorization. Men are being killed."

The "Times" article also cited William Kunstler, one of the AIM attorneys as saying that Bureau of Indian Affairs policemen had threatened to kill one AIM member for each Government agent assaulted.

One June 26, a bomb exploded during the night on the view terrace of the Mt. Rushmore National Memorial.

According to a UPI story, Harvey Wickware, the memorial superintendent, declined to speculate on whether the incident was connected with the shooting deaths on the Pine Ridge reservation, about 75 miles to the southeast.

AGENTS FROM THE FBI and the Alcohol, Tobacco and Firearms unit of the Treasury Department were investigating.

Sam Greer, a student here on the MSSC campus, was employed at the monument as a baker in the concession building of the Visitor area, during the summer of 1975, and remarked about the bombing.

"There were only two of us on duty in the concession building when the explosion occurred at 4 a.m. When we found out what it was, it put quite a scare into us, and the next day when everyone found out, the rest of the employees felt a little fear I'm sure. We had heard of the shootings at Pine Ridge, and people were starting to blame everything on the Custer trial of Russell Means. The employees were soon restricted to going in groups if they went out at night, and soon about 100 rangers, FBI agents, and special troopers were brought into the park with artillery from A to Z. Eventually we were all more afraid of being mistakenly assaulted by Rangers than being intentiionally assaulted by Indians. If the Government wasn't so intent on an eye for an eye, the whole mess could have been avoided."

Greer went on to say, "I think that people are so caught up in their selfishness that someday they'll have to pay. Right now the mountains and forests are feeling the pain, but they remember, and in the end people will have to pay."

Greer's final comments sum up rather well what Joseph of the Nez Perce Indians said in 1877, "We are contented to let things remain as the Great Spirit made them. The white men are not, and will change the rivers and mountains if they do not suit them."

Saving the Land

Conservation and preservation of our natural resources has been undertaken by federal and state agencies in the past century. However, a problem arises with government control — conflict of interest. It is reassuring to know that there are organizations, comprised of private citizens, that have taken up the ecological cause.

Several of these are active in Southwest Missouri — the Missouri Prairie Foundation, the Audobon Society, the Izaak Walton League and Ducks Unlimited, to name a few.

THE MISSOURI PRAIRIE FOUNDATION was founded in 1966 to "check the loss of the once extensive tallgrass prairies of the state," according to material from the foundation. "Our concern is to preserve the more biologically interesting and aesthetically pleasing of these remaining tracts before all are lost forever."

Before European settlement, almost 40 percent of this state was prairie. The 3,000 acres that have been saved have been preserved, not by the federal government, but by state agencies and private organizations.

According to Jane Roberts, a member of the MPF Board of Directors, "We are talking about an endangered species. The prairie is going to disappear."

Friendly Prairie, covering 40 acres in Pettis County, was the foundation's first purchase. More than 245 plant species exist on the land and over 53 species of birds have been spotted there.

THE GROUP ALSO OWNS PENNSYLVANIA PRAIRIE in Dade County, which covers 160 acres, and Golden Prairie, which covers 260 acres in Barton County. Golden Prairie was recently designated a "registered natural landmark" by the National Park Service.

La Petite Gemme, a 40 acre tract near Bolivar, is the newest prairie acquired by the Foundation. It was purchased because "the formation of the prairie was so unusual," according to Roberts. "This one had such a rich sampling of various flora."

The group has cooperated with other organizations to preserve land. Kennon Prairie Tract, near El Dorado Springs, was acquired by the Nature Conservancy, in cooperation with the Foundation.

Loess mounds are "something we are very interested in," according said Roberts.

ACCORDING TO JON HAWKER of Meramec Community College, "The Loess mounds in northwestern Missouri are a product of the last glacial period when large quantities of wind-blown glacial dust (loess) accumulated to depths of 150 feet or more. The largest mounds formed at the end of the advancing sheet along the Missouri River, north of Joplin. The steep loess soil bluffs are peculiarly resistant to erosion and form a striking contrast with the broad flat floodplain and the gently rolling hills to the north and east. Rapid run-off of rainwater combines with a hot, windy, southwest exposure, to produce near-desert conditions."

The mounds have many characteristics of prairie land — on a smaller, yet unique scale.

Efforts to preserve take sEveral pathways. The MPF has five major objectives.

The first is to acquire and manage prairies for permanent preservations, as with the four prairies already owned by the Foundation. Secondly the group encourages landowners to preserve virgin prairies. The MPF was influential in Empire Districts's preservation of 80 acres in Jasper County. They also encouraged The Illinois Central Gulf Railroad and Norfolk and Western Railway to continue their present maintenance of prairie land along railroad right-of-ways.

RESTORING PRAIRIE GRASSES in suitable agricultural situations is another goal of the organization. They have allotted $1,500 to go toward the construction of "Nesbitt" drills, which plants grass.

The foundation also disseminates educational material. A quarterly newsletter is published, and slides and films are available for use by interested persons.

Cooperating with other government and private organizations and individuals interested in prairies is the final objective. The group has worked with the Missouri Department of Conservation, Nature Conservancy, Missouri Botanical Gardens, Federated Garden Clubs and the Audubon Society.

THE FOUNDATION AND ITS 600 MEMBERS can look forward to furthering these goals in the years to come.

Theodore Roosevelt once said, "I do not understand how any man or woman who really loves nature can fail to try to exert all influence in support of such objects as those of the Audubon Society."

The national Audubon Society, founded in 1905, is one of the oldest and largest organizations in the United States, working for the conservation of our natural resources.

Locally, the Ozark Gateway Society is barely a year old and still in its formative stages. As such, it has yet to undertake any major conservation projects.

One of eight groups in Missouri and part of the Midwest Region, which encompasses five states, the Ozark chapter has 53 members from the southwest corner of the state.

Only 25 people are really active in the organization, according to Dean Hamby, president of the area chapter. This has hampered action.

IN THE PAST YEAR THE GROUP has spent most of its time planning and taking field trips. "We've taken canoe trips. We've gone to the prairies — we're interested in that. We've been on several bird-watching expeditions.

ONE PROJECT IN THE WORKS is participation in a bird count. "This coming Christmas we'll probably enter into the National Christmas bird count," Hamby stated. This entails the observation and counting of the different types of birds in different segments of this area.

Hamby noted that one reason the group has yet to undertake any conservation project is that "when we get down to the nitty-gritty they (the inactive members) take the attitude of 'let someone else do it.' "

"We're not into fighting anything yet," he said.

Hamby said that "We do have some interest in Ozark Gateway pollution, but we are just struggling. We'd like to have more people get into this and help us."

"AS PRESIDENT, I THINK THAT'S what we've got to do — to get into projects — but we're just looking to see which way we want to go on some of these things," he concluded.

Nationally, the Audubon Society offers many services and activities.

Thousands of acres of land and water comprise the Audubon Wildlife Sanctuaries, which offer shelter to threatened species of migratory birds and other wild animals. The Society also has an educational program. Wildlife films are available to community groups and there are education aids for schools. The Society also funds reasearch programs and trains adults to teach nature and conservation subjects.

EUROPEAN ENVIRONMENTALIST JEAN DORST summed it up by saying, "The National Audubon Society ... has done more to protect nature than any other private group in the world."

Only one chapter of the Izaak Walton League exists in the State of Missouri, and that chapter is in Southwest Missouri.

Organized in 1922 by business people in Chicago, the Izaak Walton League is concerned with environmental and conservation problems.

There are Chapters of IWL in every state and membership totals around 50,000.

THERE ARE APPROXIMATELY 30 PERSONS in the area chapter, according to Dr. O. E. Orr, president. At one time there were close to 400 members in the area chapter, but that number dipped, and there were only four members ten years ago.

Dr. Orr became involved with IWL when, as part of his duties as professor of biology at Missouri Southern, he was looking for an area for a nature trail, to be used by biology students.

Someone mentioned the Izaak Walton League and Dr. Orr discovered that the group owned 29 acres of land, complete with a house.

"OUR MAJOR OBJECTIVE," ORR SAID," has been to set up a nature trail for use by anyone who was interested." The group is marking a pathway that would show different ecological sights. Eventually they hope to make it as accessible as possible for outdoor education.

The property is used by the Boy Scouts and Girl Scouts, as well as by students of the college.

"SOS" ("Save Our Streams") is one of the most important of the national projects undertaken by IWL. Chapters are persuaded to "adopt" a stream to care for.

THE IZAAK WALTON LEAGUE ALSO EMPLOYS a full-time lobbyist in Washington. "They have an endowment in which they've purchased large tracts of land," Orr added.

For many years, IWL has protected many key natural areas from action which would have had long-term detrimental effects.

In 1975, IWL legal action helped prevent the construction of a nuclear power plant on the Indiana Dunes National Lakeshore. The League is currently fighting in the courts to safeguard the Boundary Waters Canoe Area.

Last year, the League stopped the U. S. Army Corps of Engineers from building Locks and Dam 26 on the upper Mississippi at Alton, Ill.

A Legal Action Fund has been established to defray expenses incurred by such action.

THE AREA CHAPTER WAS ACTIVE on National Hunting and Fishing Day last winter. Members of the group collected signatures for the referendum on the one-eighth of one percent sales tax, which would, according to Orr, "go to the State

Conservation Commission," to be used for a variety of conservation projects.

Ducks Unlimited Incorporated of America is an organization which, according to Don Bristow, president, "does nothing domestically — other than publicity." However the money spent by the organization does affect United States wildlife.

Ducks Unlimited Incorporated spends money through Ducks Unlimited of Canada.

"Practically all of our expenditures" are used to develop land on the Canadian prairie, where over 80 percent of North American Wildlife breed, Bristow explained.

THE U.S. FISH AND WILDLIFE SERVICE cannot spend federal money in Canada. Organized 38 years ago, Ducks Unlimited has expenditures which total 10 million dollars annually.

"The purpose of the organization has been and continues to be the restoration of waterfowl breeding habitat," Bristow said.

"The key to that is water," Bristow said. He explained that the water supply on the prairie had been decimated, partially due to agricultural drainage. Ducks Unlimited hopes to stabilize the aquatic habitat. Two million acres has been restored in Canada alone.

Eighteen kinds of mammals and several rare varieties of birds and some fish use the Canadian preserve. "Stabilized water is very good for fish," he said.

FIVE YEARS AGO DUCKS UNLIMITED OF MEXICO was formed for the preservation of wintering grounds. The U.S. chapter subsidized the groups with $100,000 a year for several years, to get the organization on its feet.

"In the past five years we have set up 40 thousand acres of wintering acreage," according to Bristow.

The Ducks Unlimited chapter in this area has one fund raising project a year, but that project is well-organized and brings in a considerable sum of money.

"FIVE YEARS AGO WE PROMISED A local organization that we could raise $1,500 a year," said Bristow. He added that last year the group raises $10,0000 at their annual dinner.

Six Joplin men started the organization, and there are about nine hard core members. "We need fresh ideas," Bristow stated. Bristow also serves as state vice-chairman in charge of special projects.

"This has been one of the oldest continuously operating conservation organizations that has not changed its original goals," he noted.

Ducks Unlimited has great plans for the future. "We have a goal of doubling our present acreage within the next ten years," Bristow concluded.

Environmentally speaking, the future looks good for Southwest Missouri.

A herd of Charolais cattle (above) graze on reclaimed strip mined land in the midwest. This, too, must be part of the nations search for new energy supplies. At right, it's apple blossom time in the coal mines. This commercial orchard blooms on reclaimed strip mined land at DuQuoin, Illinois. The company reports the trees grow faster on reclaimed land, are more resistant to disease and bear better fruit because mining brings to the surface trace elements which were depleted in the original topsoil. (Photos for The Crippled Turtle courtesy of the National Coal Association.)

Energy and Environment

In countless ways energy enhances the quality of our lives. But energy pollutes. Wherever energy is produced or used there is quite often some disruption of the natural world which can adversely affect human health and welfare.

The Energy Policy Project commissioned several major outside studies on significant environmental issues, and the EPP staff is still in the midst of developing a framework for analyzing energy-environmental issues. While their research is not yet completed they have described their preliminary thoughts about environmental issues. Their tentative judgement is that three issues stand out as most significant for the period from now until the year 2000:

1. Air pollution, where the damage is continuous and some costs are crudely measurable;
2. Nuclear powr uncertainties, where the likelihood of serious accidents may be small but the possible damage is great;
3. Land use problems, especially the commitment of hitherto undeveloped regions to intensive energy-related activities.

Before turning to specific environmental problems, it is first necessary to consider the general relationship between energy use and environmental quality.

IT IS IMPORTANT to understand how the level of energy use relates to environmental quality. Given a certain state of the art in control technology, pollution increases with energy use. But it is often argued that reduction of energy use is incompatible with a clean environment, since it takes energy to clean up pollution. To better understand this, the EPP commissioned a University of Michigan study on the energy needed to control pullution. Results indicate that the extra energy needed for pollution control is modest, about three percent of total use. Slower growth in energy use would not preclude having enough energy for pollution control.

Second, the less energy needed, the greater the flexibility in choosing among the different fuel options. This nation has coal enough to last for centuries; oil and gas for at least the rest of the century and nuclear fuels for several decades if used in "breeder" reactors. Vast quantities of oil are trapped in shale; and geothermal resources can meet some energy needs, particularly in the West.

Even so, a preliminary analysis tells us that all supply options must be pursued vigorously and simultaneously if historical rates of demand continue. But if growth demand slows substantially, we can forego the options that are most objectionable.

Third, reduced energy growth buys time for the development of better pollution control technologies. For example, from 1975 to 1985, sulfur dioxide controls on coal-fired power plants will be limited because of the rate at which the equipment is being made and installed. Consequently demand for control equipment would be easier met if the growth in coal-fired power plants is slower.

AIR POLLUTION EFFECTS are difficult to quantify. However, a 1973 report issued by the U.S. Environmental Protection Agency estimated the costs of air pollution at $16.1 billion for 1968:

$5.2 billion for residential property damage:
$4.7 billion for damage to inert materials:
$0.1 billion for vegetation damage:
$6.1 billion for damage to human health.

It must be understood that these figures are not hard and fast;

The drill bit is guided into the hole by a driller in a Southern Louisiana oil field. Thousands of feet down, it may—only may—find oil. (Photo courtesy of the American Petroleum Institute Photo Library by Pan American Petroleum Corp.)

value judgements are involved. But the estimate is useful in pointing out the tremendous costs associated with air pollution damage. A more recent EPA report indicates that since 1868 these damage costs have dropped, due both to increase use of air pollution controls and to the switch by power plants from coal to fuel oil and natural gas. If we delay implementing air quality control because of energy shortages and go back to reater use of coal, then the 1968 estimates may not be out of line.

There are strong pressures to delay putting air quality controls into full effect. A basic issue is the control of sulfur dioxide emissions. Recently the Department of Health, Education, and Welfare re-evaluated the health effects of sulfur dioxide to determine whether the air quality standards should be lowered. The study found that sulfur dioxide concentration levels that are of twice the current standards clearly produce adverse health effects at about the level of the current standards. The report concluded that there is no health basis for relaxing pollution control standards.

ANOTHER REPORT from the Environmental Protection Agency assessed air quality standards generally in terms of safety margins. The report states that there is no clear margin of safety for any pollutant above the legal standards. There is little or no safety margin at all for sulfur dioxide or particles.

Economic arguments cannot always justify environmental controls, because of the difficulty of putting monetary values on damages. But they do make a convincing case for control of sulfur dioxides. The EPA estimated that about $8 billion of the 1968 air pollution damages could be attributed to sulfur dioxide, roughly half if it ($4 billion) due to sulfur dioxide emissions from power plants. Preliminary estimates are that the cost of controlling this pollutant is probably not greater than the cost of the damage from the pollution. Putting sulfur dioxide controls on the power plants that caused $4 billion damages in 1968 would not, for example, cost more than $3 billion per year including fixed charges and operating costs.

The air pollution issue is critical today because many proposed solutions to the present crisis could hurt air quality. We are switching some oil-fired power plants back to coal. Within a year it is possible to replace up to 600,000 barrels of fuel oil a day with 60 million tons of coal a year. Without proper pollution controls, this could involve serious damage to human health. Preliminary results of an EPP study by the American Public Health Association help us estimate the results of such a switch to higher sulfur fuels without controls. This study says iF the sulfur dioxide pollution occurred in densely populated places, it could cause in one year an extra 13 to 14 thousands cases of respiratory disease in children under five, and about 12 thousand deaths of people over 60. Many more people would be afflicted with illness and discomfort that are not easily quantified.

IN THE LIGHT OF THESE tentative findings, other options, such as curbing demand, should be carefully considered. For example, reducing transportation energy use by 7 per cent would save about the same amount of oil as would the power plant switch to coal. This could be done with measures such as gasoline ratioing and airline rescheduling. By-products of this option would be better air quality and less traffic congestion. The trade-off here is between transportation inconvenience and damage to human health, even loss of lives.

The Project finds a significant, but seldom discussed, unsolved air pollution problem is that of airborne small particles from burning fossil fuels. Current technology makes it possible to remove from smoke stacks the particles that are larger than about one micron in diameter. These are visible as smoke. But it is not possible to remove small particles which are visible as haze, or to control emissions that contribute to small particle formation. There is growing evidence that these smaller particles which can lodge in the deep recesses of the lung, are the ones most responsible for adverse health effects. Small particles can interact with sulfur dioxide in the air to create a much worse health hazard than can sulfur dioxide or particle pollution independently. For example, metallic particles in the air help to convert sulfur dioxide into sulfuric acids and sulfates—pollutants more hazardous than sulfur dixoide itself. At present there are no standards for sulfate air pollution.

There is growing evidence that small particles tend to worsen the impact of other pollutants. Another example of this is that harmful trace elements that are released in burning fossil fuels are found in the highest concentration with these small particles. Small particles may carry these elements into the lungs; from there they may enter the blood stream and interfere with body functions. Both oil and coal bear trace elements. As will be seen, the trace element hazard varies from one type of coal to another.

The problem of large particle pollution is worse for coal than for oil. But the small particle problem may be about as bad for both, so that switching from coal to oil would not help.

THIS PROBLEM MAY PROVE to be the most significant environmental constraint limiting expansion of fossil fuel use in the next 20 years. It must be solved if we are to achieve a clean and healthful environment. Stands must be formulated, and research on their health impacts continued. Technology to reduce small particle levels in the air should be given top research and development priority.

Another important problem is the reduction of automotive air pollution. Federal standards limit evaporative fuel loss and the exhuast emissions of nitrogen oxides, Hydrocarbons, and carbon monoxide. In order to comply with more stringent standards, U.S. auto manufacturers decided to install catalytic converters in most 1975 models. Besides reducing these pollutants the converters have the advantage over past devices of allowing the engine to be "returned" to a more efficient condition. In fact, this system is expected to regain most, if not all, of the loss in fuel economy due to earlier pollution controls.

Unfortunately, the catalytic converter introduces an additional problem of uncertain magnitude. It is now known that automobiles equipped with this device emit sulfate particles through reactions in the catalytic converter with sulfur in the fuel. Although the total amount of sulfate emitted is small, these emissions could be significant because they occur where people are, especially in urban areas. The best available estimates suggest that measurable adverse health effects will occur as early as two or three years after the introduction of catalytic converters. This question is receiving further study.

As new controls appear on the scene and as knowledge of environmental impacts improves air pollution problems will change. One that is likely to receive increasing attention is that of nitrogen oxide emissions. Few health studies are available today on the effects of nitrogen oxides. The air quality standard set for nitrogen dixoide is subject to considerable controversy. The EPA has taken the position that the nitrogen oxide auto emissions standard set for 1977 is not needed to protect human health and has asked Congress to relax this emission standard by five times its present level, until 1982. But concern remains that exposures to nitrous acid, nitric acid, and suspended particulate intrates have not been adequately considered.

The history of our experience with air pollution problems suggests that we are not likely to find them less serious as we learn more about their effects. It is more probable that as one problem is "solved" another will be identified. Air pollution is not a transient concern.

ANOTHER ISSUE is that of land use. It is an issue which covers a multitude of perplexing problems. It includes strip mining for coal, power plant siting, building refineries next to beaches. More significant than the sheer quantities of land involved are the multiplying effects of changing land use patterns from energy activities. Energy growth may mean opening "unspoiled" aread to energy or industrial operations. Two cases stand out. First, if domestic oil and gas is to increase significantly, there will be development of the Atlantic, Pacific, and Alaskan offshore resources. Onshore support operations—terminals, refineries, petrochemical plants—will follow. In many places this would mean trading natural beaches or marshes for industrial development.

In the Rocky Mountain region, the exploitation of coal and oil shale would lead to an influx of population and industry. Today the region is sparsely populated, primarily agrarian, devoted to ranching and to preserving environmental values. If minemouth power plants were built to burn coal, or if synthetic fuels from coal were produced in plants near the coal mines, the effects in the locality of development would be especially severe. An alternative would be to shift the development to already industrialized areas by exporting the coal for processing there. The trade-offs here are between spoiling parts of the relatively undeveloped Rocky Mountain region with development and increasing pollution where most people live.

Another important problem is the siting queston. It is increasingly difficult to find sites for energy facilities, such as refineries and power plants. New facilities are usually very large and serve a broad region; few people welcome them in their backyard. The greater the growth in energy, the sharper will be the conflicts among local, regional and national interests.

So far we have considered general environmental impacts of energy systems. Bu there are also special problems with particular fuels.

COAL PRESENTS MANY ENVIRONMENTAL problems that will hinder its rapid growth, at least in the near future. First, underground mining in the East has long been the most hazardous industrial occupation in the United States. Recently, under the Coal Mining Health and Safety Act of 1969, conditions have begun to improve, but the safety record is still poor. There is no reason that underground coal mining health and safety conditions cannot improve further. In Europe, especially in Great Britain, mining has for decades been much safer than mining in this country. Moreover, advanced mining techniques are potentially able to reduce the number of workers needed in mines. Such technology should be vigorously pursued. There is much more coal ultimately available by deep mining than by stripping, about 12 times as much. Surface mining which denudes large areas, creates soil erosion, pollutes surface waters, destroys wildlife habitats and degrades land values, poses many problems that are difficult to solve. Because of this given increased mechanization and stronger enforcment of safety measures, there is a future for U.S. underground mining.

Reclamation problems for coal surface mining are qualitatively different in each of three regions: Appalachia, the Midwest, and the West.

Much of the surface mining in Appalachia is in hilly terrain where reclamation is difficult, if not impossible. A total ban against strip mining on slopes steeper than 20 degress is widely recommended. Such a ban would likely have a signifcant short-term impact, as about 15 per cent of total U.S. coal production is surface mined on such sleep slopes in Appalachia: about half of this production is low-sulfur coal (less than 1 per cent sulfur). Utilities denied this low-sulfur coal would have a short-term problem of finding replacement fuel if this production were stopped abruptly. For the longer term, a ban on surface mining on slopes above 20 degrees would have little impact. Appalachian strippable coal reserves on slopes greater than 20 degrees amount to:

less than 30 per cent of Appalachian strippable coal reserves;
less than 3 per cent of total Appalachian coal reserves;
about 4 per cent of total U.S. strippable reserves;
about 0.1 per cent of total U.S. recoverable coal.

SURFACE MINING IN THE MIDWEST (mainly Illinois, Indiana, and Western Kentucky) is on flatter terrain where reclamation appears feasible. But Midwest coal has a higher sulfur content (much of it containing more than 3 per cent sulfur) and must be burned in plants with sulfur dioxide controls in order to meet emission standards.

Most Western coal has a low sulfur content and therefore appears attractive for meeting air quality standards, even for use in Midwestern and Eastern power plants. In the past, the high cost of shipping made the Western coal too expensive, but fuel oil is so expensive now that shipping costs are no longer prohibitive. But the use of Western coal is still limited by four factors: the rate at which new Western mines can be opened; railroad capacity; the fact that boilers in Eastern or Midwestern coal–fired plants must be modified to burn Western coal; and reclamation problems.

The reclamation issue is an unresolved problem for Western coal. An EPP-sponsored study by the National Academy of Sciences points out that in many parts of the West where the rainfall is less than 10 inches annually and where soils cannot retain moisture, reclamation is not feasible. The study concludes that if the best available technologies were applied, stable revegetation could likely be established in certain areas which are favored with good soil and adequate rainfall. Favorable conditions appear to exist in the mixed grass region of the Northern Great Plains and the Ponderosa pine and mountain shrub zone of the Rockies. These areas contain about 60 per cent of the surface minable coal reserves in the Western United States. In these areas the NAS estimates that reclamation would add only a few cents a ton to the price of coal. But the success of rehabilitation would depend on an intensive coordinated effort that has never been made anywhere in the United States and would require strong new federal and state laws.

WATER SCARCITY is a major factor limiting the development of coal conversion industries in the West. The NAS study concludes that while there may be adequate water for mining and rehabilitation of many areas, there is not enough water available there for large scale operations like gasifying and liquefying coal or generating electric power. Another study now in progress should provide new information on the water resources availability problem.

We have mentioned that trace element air pollution is associated with small particles in the burning of fossil fuels. Coal is a leading example. The trace element content appears to vary from one kind of coal to another and from one coal-bearing region to another. Several of these trace elements (lead, antimony, zinc, mercury, arsenic, cadmium, nickel) appear to be associated with the inorganic sulfur in coal so that possible health hazards would be greater for high-sulfur coals like those in the Midwest. Two other trace elements (beryllium and selenium) generally occur in greatest concentrations with Appalachian coals, and in lowest concentrations with Western coals. Regional variations of some important trace elements (like fluorine) have not been asssessed as of yet. Such regional differences may be important in shaping a coal use strategy. Standards for trace element emissions need to be formulated, and research must be carried out on their control. For the trace elements linked with sulfur, removing the sulfur from the fuel before burning can effectively reduce the trace element content. Other techniques for removing trace metals are under development.

Another pollution problem of high-sulfur coal which is yet unsolved is acid mine drainage where sulfuric acid leached from exposed coal seams (in both surface and underground mines) contaminates surface and ground waters. A Department of the Interior estimate in 1969 indicated that capital costs for abatement and control of acid mine drainage at that time would amount to $6.5 billion.

FROM AN ENVIRONMENTAL perspective, there is no entirely satisfactory way to use coal in the near term. Growth in coal use until the early 1980s might best be accommodated by a mix of Western, Midwestern, and Appalachian surface mined coal. Such growth should be restricted to areas where reclamation appears feasible. In Appalachia, this means avoiding steep slopes. Regulations should be adopted for committing the best available technology to reclamation. When stack gas sulfur removal technolgies are available, high-sulfur coal can be burned. Should it prove necessary to grant variances to allow burning high-sulfur coal this use should be coupled with requirements for implementing stack gas controls.

After 1985 such controls are likely to be widely available; this will remove a major constraint on the use of plentiful high-sulfur Midwestern and Eastern coals. Less hazardous highly mechanized underground mining methods can be ready for use if R & D efforts are vigorously pursued now. Still, the small-particle air pollution problem may prove to be an environmental limiting factor on coal use. At this stage of our study it appears to us that the optimal environmental strategy for coal extraction after 1985 would involve:

Eastern low slope and Midwestern surface mines with planned reclamation;

Underground mines with improved mining safety conditions (perhaps highly mechanized);

Western surface mines in areas where reclamation looks feasible.

AS FOR OIL, a potential for oil spills exists in drillings and recovery operations on the Outer Continental Shelf in transporting Alaskan oil from the Trans-Alaska Pipeline (TAPS) by tanker down to the lower 48 states and in importing oil by tanker.

The more important problems for the United States are OCS development and the tanker link for the Trans-Alaska Pipeline. Data also shows that oil imports give rise to oil spills, not only in our own waters, but worldwide. In and around U.S. waters, imports contribute less spillage than OCS development does. But spillage from our imports is substantial in the waters of the rest of the world. Most of the volume of spills from both OCS operations and imports is likely to arise from major catastrophic accidents, not from everyday routine operations.

There is considerable controversy and only limited knowledge about the harmful biological effects of oil spills. An EPP commissioned study on the ecological effects of oil pollution in the marine environment provides some insights. Immediate effects are clear: thousands of birds, perish, and if the spill is in shallow water shellfish also die in large numbers. But immediate mortality is only part of the problem. There is also evidence of longer term effects on marine life. Three special environments—polar regions, estuaries and tropical coral reefs—appear to be particularly vulnerable to harm. Experts are also sharply divided about the severity and permanency of biological damage from oil spills. The oil industry generally holds the view that effects are not great in the long run, but there is much counter evidence. Considerably more research is needed before the risk can be fully assessed.

The EPP commissioned another oil spill study to provide an overview of present technology and future prospects for prevention, control, and clean-up of oil spills. This study points out that prevention technology is, by and large, quite good. Clean-up technology is less successful. It is virtually impossible at present to contain and remove spilled oil when waves higher than three feet and-or currents of more than one knot are present. Chemical dispersants may have harmful side effects that are worse than the effects of the oil itself. Reseach and development on better oil spill technology should be given high priority.

THE GREEN RIVER FORMATION located in Colorado, Utah, and Wyoming is the most promising region for shale oil production. This formation alone contains about 600 billion barrels of oil trapped in high grade deposits. This compares with estimated U.S. recoverable petroleum resources of about 500 billion barrels.

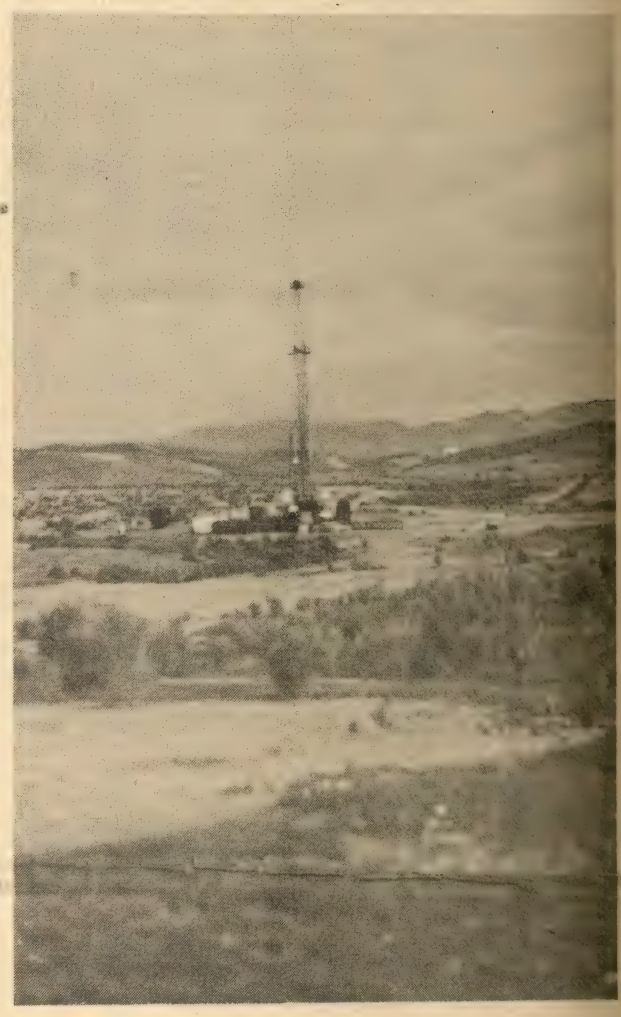
Oil shale development raises serious environmental problems. The shale may be surface-mined, extracted from conventional underground mines, or processed in situ underground. With surface or conventional underground mining, it is very difficult to dispose of huge quantities of spent shale (larger in volume than before the oil was extracted). Revegetation of the spoil is difficult; it may be impossible within a period as short as ten years. The waste disposal and revegetation problems can be largely avoided through the in situ process, but disturbance of underground aquifiers and contamination of ground water remain difficult problems for all processes. (The in situ process is one by which the rock is fractured underground with explosives or other means, and the shale is heated in place to separate the oil from the rock.)

Large amounts of water would be needed for commercial operation in a region where water resources are limited. But water requirements for producing oil from shale are only one-third of what is required to produce liquid fuels from coal, and probably still less if the in situ process is used.

AS FOR NUCLEAR FISSION POWER, it provides less than 5 per cent of our electric energy, but it is rapidly becoming a more important source. The U.S. Atomic Energy Commission expects nuclear installed generating capacity to increase 12 to 15 times in 1985 and three to four times more between 1985 and 2000. It use poses serious environmental issues, including reactor safety, radioactive waste management, and nuclear theft. Nuclear risks are qualitatively very different from those of fossil fuel systems. Like coal-or oil-fired plants, nuclear plants produce thermal pollution, but in their day-to-day operation they produce no air pollution in the usual sense. Radioactive emissions can be, and have been kept to low levels. Moreover, land use problems are small when compared to coal. To produce a given amount of electricity, about 80 times more land must be surface-mined for coal as for uranium.

But nuclear power has unique problems and uncertainties. Radioactive wastes from power plants are deadly materials that must be isolated from the environment for hundreds, sometimes hundreds of thousands, of years.

A walking dragline swings an 85-cubic-yard bucket on the end of a 275-foot boom. This machine works at the Homestead mine of Peabody Coal Co. in western Kentucky. (Photo from Marion Power Shovel Co.)



Oil–black milk of the earth

Not since the depression of the 1930s had the economies of nations around the world suffered such peacetime disruptions and strain. Factories shut down, workers were laidoff, lights dimmed, gasoline stations closed, Sunday driving was banned, fuel prices soared, stock markets fell, and shortages threatened in a host of products from perfume to fertilizer.

Oil. For more than half a century it had been an inexpensive resource, a black milk of the earth on which nations fed and grew strong. The supply seemed infinite and by 1973 this amazingly versatile substance had pervaded almost every phase of our lives.

THEN THE ARABS CONSTRICTED the flow, with convulsive results. Saudi Arabia, largest oil producer in the Middle East, has a population less than four per cent than that of the United States and a gross national product scarcely one per cent as large. Yet, oil had become a resource so vital that the most powerful industrial nations faced recession or, as in the case of Japan, outright collapse if Arab cutbacks persisted.

Moreover, the United States awoke to the realization that the oil industry itself had grown so huge and complex that few people could comprehend its operation. The combined assets of this nation's oil companies total more than 70 billion dollars. A number of these corporate giants operate with budgets exceeding those of many nations.

But the United States rose to the challenge in efforts to conserve the nation's oil supplies. A controversial and unpopular 55 mph speed limit was enacted on the nation's highways and even observed by some motorists. Even now substantial confusion exists about our current gasoline supply situation. Many persons believe that the entire energy crisis is just a fable the government has invented to plague consumers. Others think that major oil companies are the culprits, hoarding huge supplies of gasoline so profits will skyrocket.

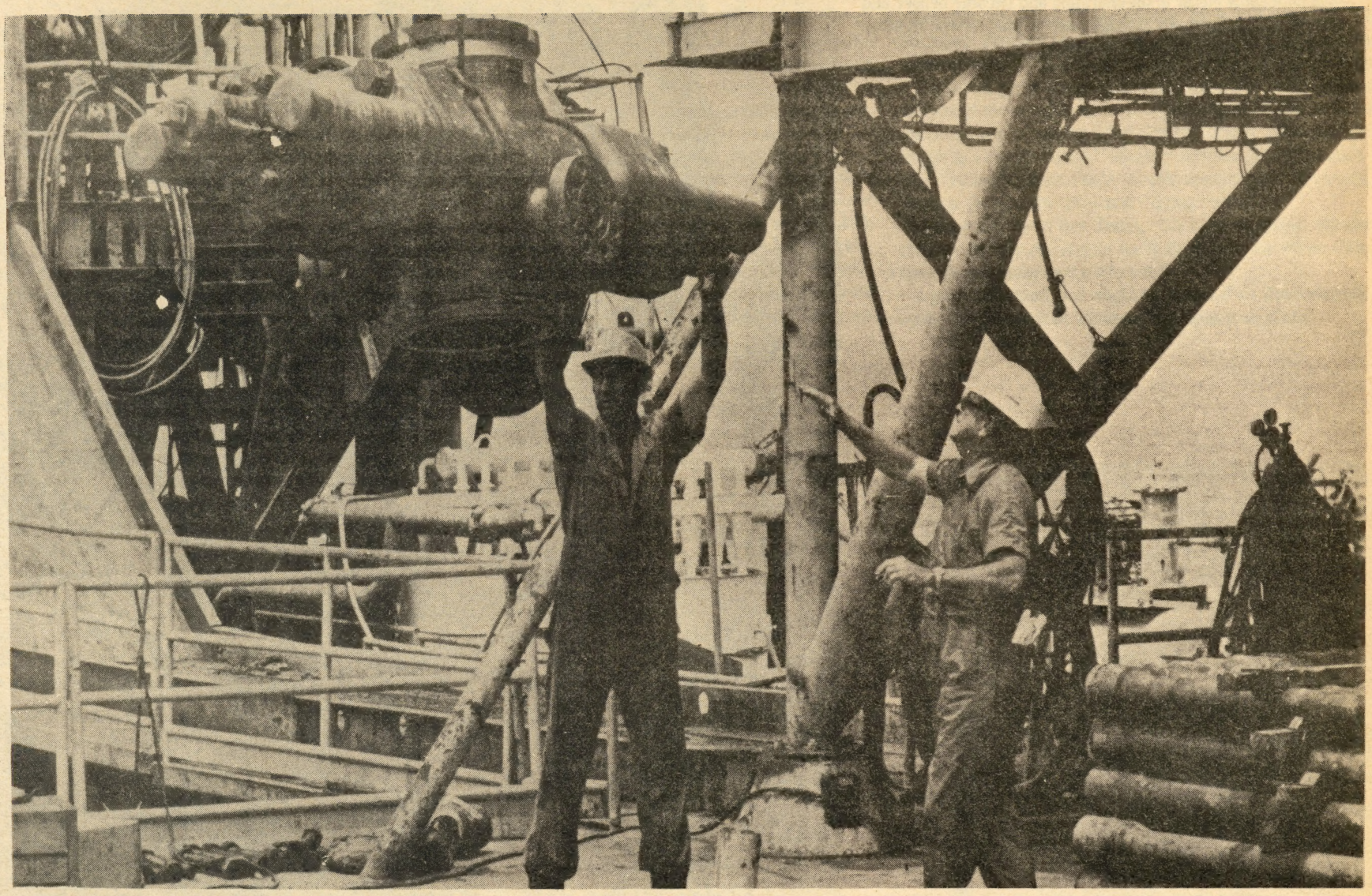
TODAY, A FOURTH OF ALL ENERGY used in Missouri is gasoline, 73 per cent of which is used by automobiles on our highways. Each year the average American can virtually consume his weight in gasoline. We use more energy to fuel our cars than for any single purpose. Energy experts believe that conserving gasoline is by far the easiest and most effective way of reducing our consumption of petroleum.

The Federal Highway Administration has determined that the total out-of-pocket cost of owning and operating a standard-sized car is 15.9 cents per mile and for a sub-compact model, 11.2 cents per mile. Over a 10-year life span, the outlays for a standard car total $15,892 or $4.35 per day, and for a sub-compact $11,153 or $3.06 per day.

THE AMOUNT SPENT ON GASOLINE alone is significant. There were 2,135,997 passenger vehicles registered in Missouri in 1974, or about 1.8 automobiles for each family of four. Each automobile averaged about 14.2 miles per gallon compared to 15 m.p.g. in 1950 and 15.4 m.p.g. in 1936. The average automobile annually travels 11,290 miles and consumes 793 gallons of gasoline.

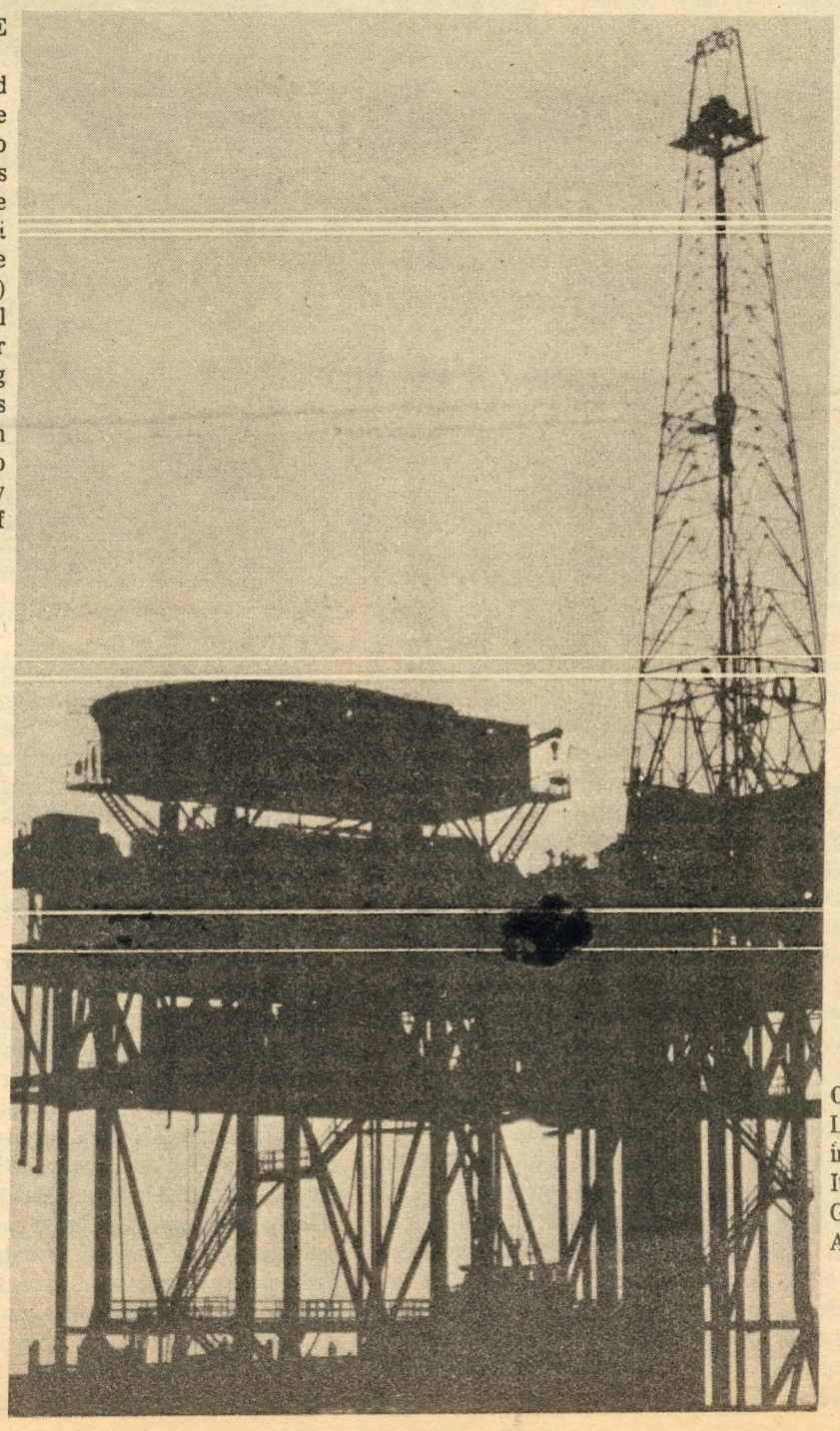
At 14.2 miles per gallon the average Missouri driver spends close to $4,000 for gasoline for each 100,000 miles driven. When the costs of driving a car are methodically evaluated, the resulting amounts serve to make a car owner think seriously about gasoline conservation to reduce the cost of driving a car. For example, a 40 per cent reduction in gasoline use for automobiles in Missouri in 1974 would have represented a saving of 632,255,000 gallons or enough energy to fuel roughly the equivalent of 39,500 tractors for 10 years.

MEANWHILE, A SEARCH STILL CONTINUES for alternate



WELLS OFFSHORE EQUIPMENT BLOWOUT PREVENTER. Drilling superintendent Lacy Darby, the man who runs the platform, supervises the inspection of a blowout preventer before it is installed. (Photo by Exxon Corporation, Courtesy of the American Petroleum Institute Photo Library.)

PICTURES ON OPPOSITE PAGE:
Upper left: Even with the aid of scientific knowledge, the only way to find oil or gas is to drill for it. As a well gets deeper, new sections are added to the pipe string that turns the drill bit. (Picture from Mobil Oil Corporation.)
Upper right: An asphalto oil field in Texas gives another view of the never-ending search for fuel. (Both pictures courtesy of the American Petroleum Institute Photo Library, made especially available for this edition of The Crippled Turtle.)



power sources. A car in England runs on pig manure. A former chemistry teacher in Michigan dumps grass clippings, leaves, table scraps, and coal into a backyard still, and the resulting brew runs his car, motorcycle, and lawnmower. Los Angeles is making methane gas from garbage. All of these harness a power as old as life and death: the process of decay.

Power, it would appear, is available from a wide range of sources. Money, time, and a sense of urgency are needed to tap them. How much time do we have? The answer is keyed to the peak of world oil production, for the drop-off that follows will be swift. It is predicted that oil production should reach its peak in 1995. After that, alternate sources will be mandatory.

Cries of warning over shortages of many resources—wood, tin, aluminum—have been sounded for years, but none will effect our lives as directly as the shortage of oil. When that shortage jolted the world with its threat to shelter, mobility, and livelihood, the depletion of everything came somehow sharper into focus.

If the first gift of oil was the gift of progress, its next gift may be the gift of concern—for the way we live, for our diminishing resources, and for our earth.

OFFSHORE DRILLING NEAR MORGAN CITY, LOUISIANA. Located in an area where water depth is 210 feet, this platform in the Eugene Island field is 100 miles south of Morgan City, La. It produces gas only. The platform is one of the largest in the Gulf of Mexico. (Photo by Exxon Corporation, Courtesy of the American Petroleum Institute Photo Library.)

POLLUTION CAUSED by smoke plumes from seven steel mills is shown in this startling picture of Lake Michigan. Taken by a space sattelite, the picture shows effects of smoke plumes on the shallow convective clouds. The clouds forming out of the plumes begin noticeably closer to the shoreline and become denser and more well developed, an obvious case of inadvertent weather modiication. (Photo courtesy of NASA.)

Industry and EPA

The arguments between industry and environmental protection agencies continue on, nearly four years since the sweeping Federal and State war against water pollution began in late 1972 when Congress enacted the Federal Water Pollution Control Act Amendments. From all observations, the major points of disagreement vary little from the nation's biggest industries to smaller local industries in the Joplin area such as W. R. Grace and Allgeier, Martin and Associates, a building contracting firm. They vary, it appears, only in degree.

Business as a whole has made tremendous efforts toward cleaning up America's pollution. Industry, unsubsidized in any way by the United States Govermnent has spent vast amounts of money in modifying facilities and processes to control discharge of pollutants into lakes and rivers. But, as Russell Peterson, Chairman of the President's Council on Environmental Quality said last year in a "U.S. News" interview, "As is true with any large family of people there is quite a range of viewpoints. Some are out in front pushing hard to protect the environment, while others get dragged screaming into the future."

Peterson's statements best characterize the attitude of industry as a whole toward EPA and other pollution control agencies simply by showing that no uniform "attitude" or "official stand" exists. Some companies are eager to cooperate with new standards and (Although compliance is, undeniably, under duress) have accepted Federal regulation as a reality. Other industries comply grudgingly, charging unethical governmental interference, inequities and economic repression brought on by forced installation of filters, monitoring methods, etc. One prime "bad guy" in the eyes of the Environmental Protection Agency is the U.S. Steel corporation. E. B. Speer, that company's chairman of the board charged last year that "the lifeblood of America's economic strength," is being undermined by the Clean Air Act of 1970. Speer wants to see the act changed before it does what he feels will be needless and irreparable damage to the steel industry and the nation as a whole. U.S. Steel's attitude is the target of criticism even by other industries whose thoughts were characterized recently when one official referred to the company as "perfect bastards," for their harmful blows in the past to the environment.

CURRENT GOVERNMENT REGULATIONS pertaining to pollution are direct results of Federal Amendments passed in 1972 which updated and strengthened water pollution legislation. Basically, Congress intended the Act to achieve one major goal: by July 1, 1985, the nation's waters would be clean enough to protect fish, shellfish and wildlife and to permit swimming and other recreational use. For industry the new legislation formed a two-level program for the application of effluent limitations for iNdustrial sources already existing. The first level calls for achievement of "best practicable technology currently available." This level is considered to be the minimum of compliance under law and must be attained by all plants by July 1, 1977.

The second level is based on the "best available technology economically achievable." According to a pamphlet prepared by the Izaak Walton League, "Best available technology will be based on the very best control and treatment measures that have been or are capable of being economically achieved. July 1, 1983 is the date by which all industries must conform to Level II technology. In general terms, the application of the best available technology should support two major objectives:

(a) Achievement of the greatest amount of uniformity among categories of industries.

(b) Reduction in pollutants so that reasonable progress is being made to achieve the 1985 nation goal of 'no discharge."

Southwest Missouri is, needless to say, not considered a "major industrial area." Small industry, though, thrives in our area and these companies, their products and workers constitute an essential part of the local economy. Attitudes of officials from local industry vary widely but, for the most part, they are willing to comply with Federal, State and local regulations. Small businessmen, devoid of the isolation and the all-holy profit motive of large industries, realize the need for pollution control. Their complaints concentrate on the massive Federal bureaucracy which serves only to factionalize industry against the government with multitudinous regulations, dual standards among several agencies, massive loads of paper work and monetary expense upon a small company to instigate control devices. Local officials are also "set off" by what they

view as inequities among the pollution-control administration between guidelines for municipalities as opposed to industry. Municpal control methods are partially financed by the government and are generally more relaxed.

DAN ALLGEIER of Allgeier, Martin and Associates of Joplin is a consulting engineer for a company that works on building contracts for smaller cities in the area. In its capacity, the company must deal with the government on nearly all of their projects. Since the cities, under state and federal laws have recently had to upgrade their water systems, Allgeier's company then comes under these municipal regulations even as a private corporation. In addition Allgeier, Martin is subjected to the Equal Opportunity regulations, state mandates so on and so forth.

When asked what his company's major objections are to governmental regulation, Allgeier states that he feels the EPA is not aware of industry's problems and costs so they set unreasonable time limits and discharge limits. He feels that industry's major objection to regulations is that they invariably result in costing the companies a great deal of money. From that standpoint, then, industry sees regulation as an economically disadvantageous thing.

"We don't receive any type of subsidy for our work," AllGeier says. "Industry has to pay one-hundred percent of costs for pollution control measures and devices specified by the EPA. If industry discharges into a city system they have to pay their portion of the costs of the city treatment plant, which is kind of unfair."

First of all, according to the youthful Allgeier, environmental protection agencies don't understand that industry pays taxes and, unlike those of individuals, industry's tax dollars are not returned. Secondly, says Allgeier, they "don't understand that industries need to make a profit to survive."

"NEW RULES HAVE FORCED us to rewrite all service contracts," he says. "Formerly we worked on a percentage fee. The government has deemed that unfair because they have no reason to keep costs down. We have had to go to a different type of fee schedule and charge higher fees."

Financing is the major complaint by industry of environmental regulation. Dan Allgeier says the total cost is relegated to the companies, costs which often run into many thousands of dollars. Current tax breaks are all but nonexistent. As for the idea of government-sponsored grants businessmen (as a recent group discussion at the Ozark Regional Planning Commission revealed) are hesitant to sink any deeper into the quagmire of bureaucratic forms, permits, etc that would be associated with receiving grants, should they ever become available.

Describing the bureacratic mess, Roy Thorn, technical advisor and long-time employee of the W. R. Grace corporation of Carthage says, "We have to make out a yearly report to the Commerce Department on our water — how much is used, waste, etc. Thats a pretty good hassle in itself. Then of course, we have state reports to fill out."

In addition, Roy Thorn is responsible for obtaining Grace's National Pollutant Discharge Elimination System (NPDES) permits, the major mechanism used to regulate discharges from "point' sources, that is, any point where pollutants may enter water bodies through a pie, sewer, or conduit. These various permits and forms number countless ages and take hours of time and money to fill out.

"There has to be some degree of realism," Roy Thorn says. "I have to check federal regulations every day almost to see which apply to us. Those are from the EPA, Missouri state regulations and even the Coast Guard; We have a fuel oil storage tank near a stream which comes under Coast Guard regulations. We need to eliminate about ninety-percent of the bureaucracy. Who do I listen to when something comes under the hands of the Coast Guard, Corps of Engineers and the EPA?"

DAN ALLGEIR COMMENTS that he feels the government has a lack of confidence in private enterprise. "They don't think we can take care of ourselves."

But he goes on to add, "I think a certain amount of regulation is necessary. Some companies will always try to take advantage. But I do think we have a real problem with the ridiculousness with the bureaucracy and red tape involved."

Both men agree on one point, clearly and definitely: If there were not pollution laws on the books, industry would not be making any worthwhile efforts to clean up the environment. Allgeier, when asked if he thought they would, replied with an emphatic, "No. They (industries) are motivated strictly by profit." "I doubt it," Roy Thorn replied to the same query. Thorn feels in this area the most important harm to the water supply comes not by way of industry or even the popular scapegoat of mine run-off; Thorn feels that the greatest detriment to our community is the result of inadequate city sewage systems and uncontrolled septic tanks in non-urban areas.

Surprisingly, the public has little awareness of problems between industry and state, federal and local environmental protection agencies. One way to increase awareness is 208 Planning, which deals with water problems in urban areas. The 208 (Areawide Waste Treatment Management) plans is also concerned with such related issues as land use, zoning, development, transportation strategies, air quality and solid waste management. It also provides greater communication between industry, cities, and the public about the environmental question which helps (at least in part) to transcend the difficulty of dealing with an impersonal bureaucracy.

WHAT ABOUT ACCOMPLISHMENTS? Have stringent laws and rigid enforcement really helped our nation's streams over the past four years? Obviously, many important achievements have been overlooked by the general public. Russell E. Train, EPA administrator says, "The issues that excite public concern are those that aren't being dealt with. The more successfully we deal with the pollution problem, the less the public is interested."

Jack McWethy of "U.S. News and World Report" writes;

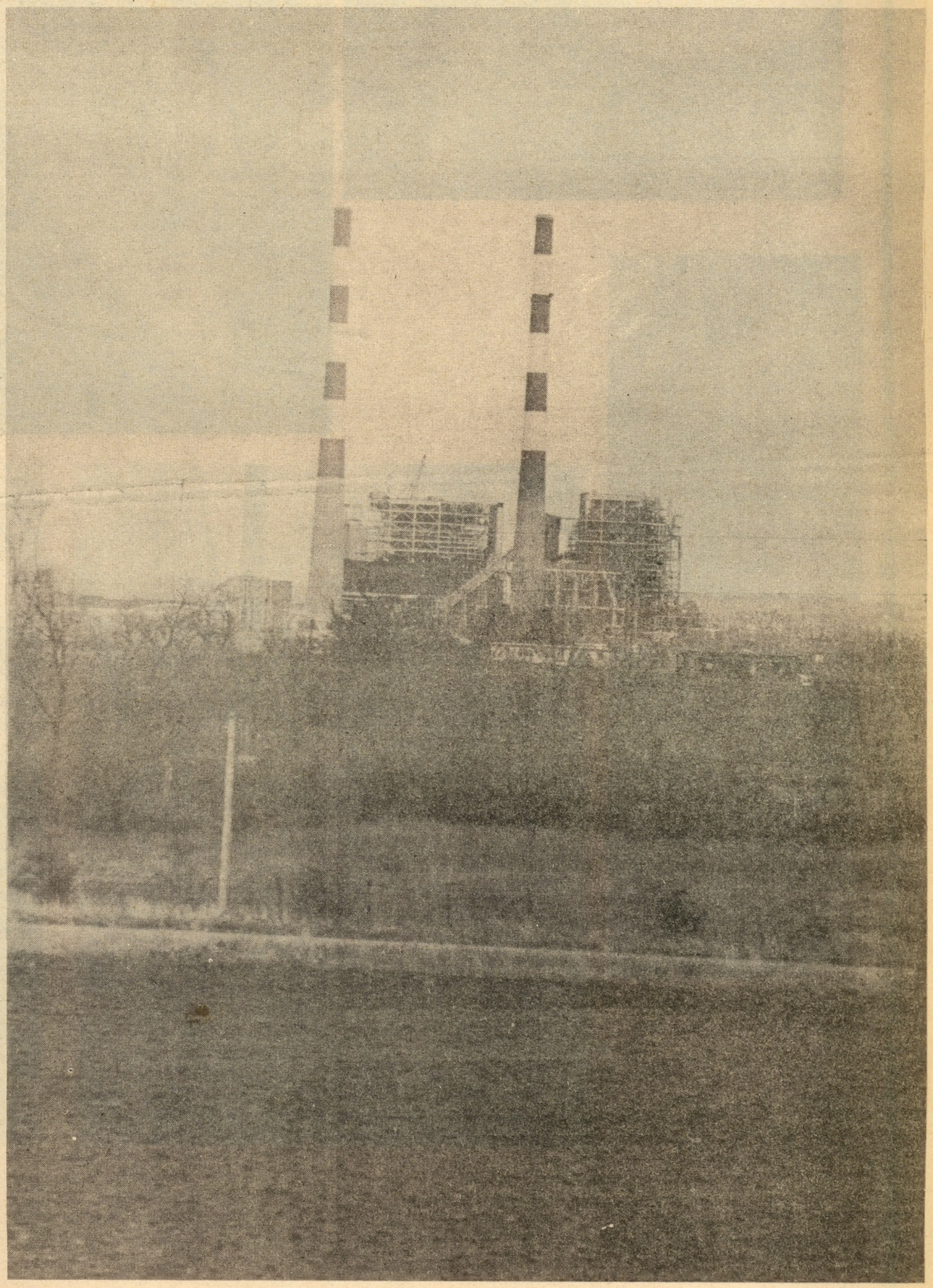
"Accomplishments in the past five years are impressive. There are again fish in the Detroit River — once regarded as little more than an open sewer."

"The Great Lakes cleanup effort has brought marine life, other than carp and sludge worms, back to Lake Erie. Lake Michigan beaches near Gary, Indiana, were reopened last summer after being closed five years ago as a health hazard."

But where great accomplishments have been made there are still many more rejuvenations to take place. On the local level the prognosis is discouraging. Turkey Creek, according to officials is already "dead," already written off as hopeless by most realistic people. Center Creek, another area waterway, is dead in certain stretches and "dying" all over.

"As a race," says Roy Thorn, "We have an option. We either change our way of living or we'll disappear. We either clean it up on the way in or on the way out."

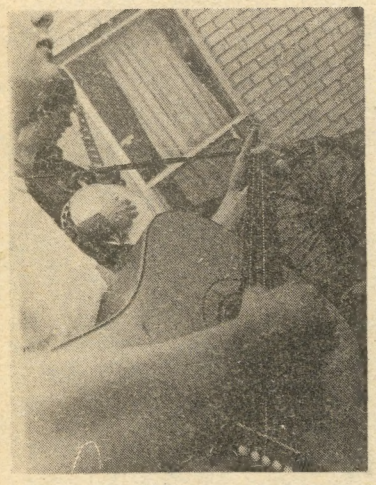
A good sentiment, one might think, but if we don't clean it up soon, there may not be anyone left to clean it up at all.



INDUSTRY, such as this, in Joplin is working hard to combat pollution problems, but some federal guidelines appear to impose harsh requirements, some experts believe.

This land is your land..

Americans have always loved to sing. With music they enjoy the land, may sing about the state of the land and about saving the land. They also remember the land. In the words of Woody Guthrie, "This land is your land; this land is my land." We ask, "What will you make of your land?



make of it what you will